February 25, 1946

STEEL

The Magazine of Metalworking and Metalproducing

IN TWO SECTIONS ESTABLISHED 1882 SECTION ONE

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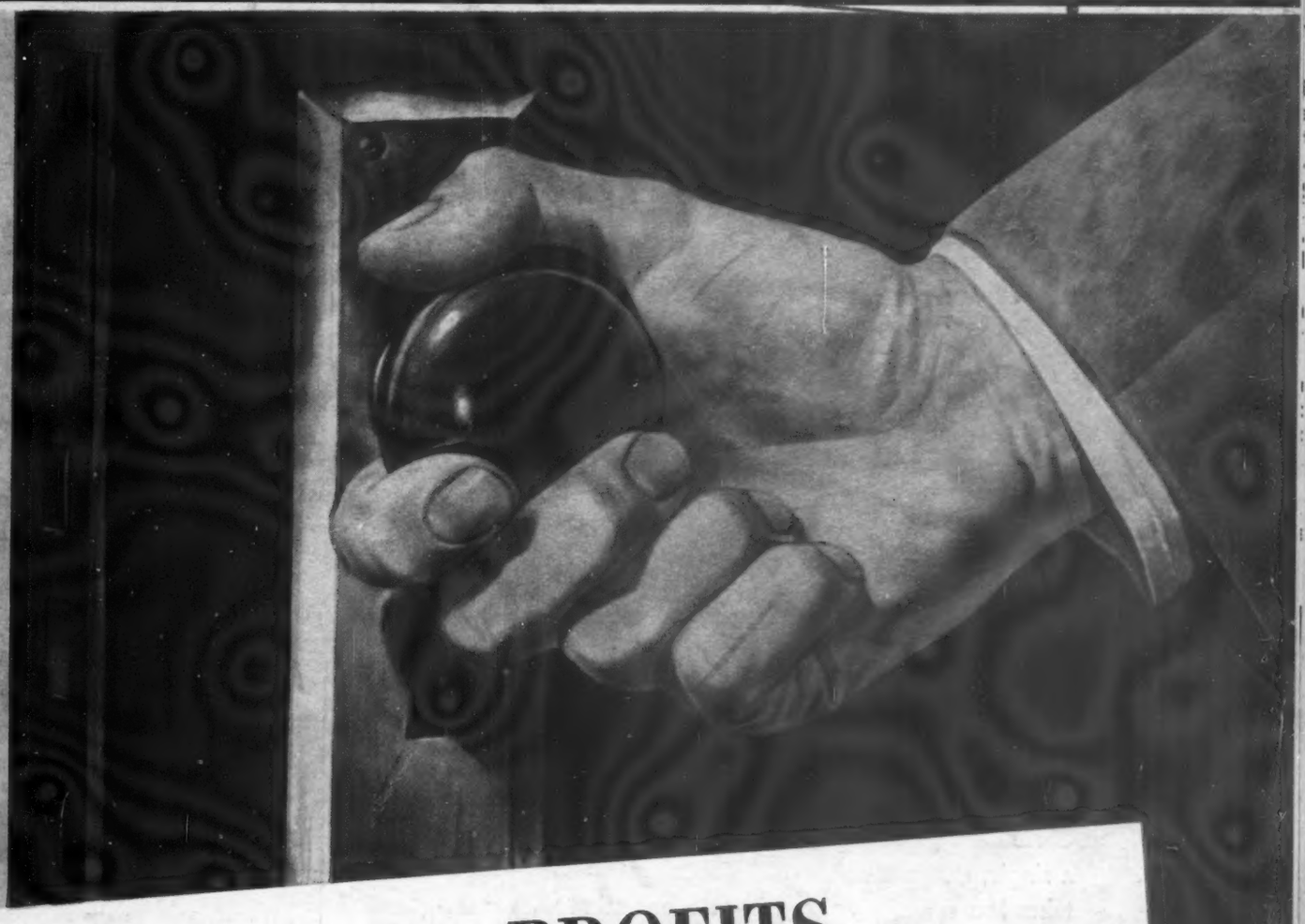


Doorway to PROFITS

WE'RE in the business of helping you to improve your position—either in production costs, processing efficiency or sales advantage.

It may seem occasionally that you're up against a blank wall—can't go any farther. But there's usually an opening in such walls: a doorway that special alloy steels can open. That's their function—either to do an existing job better, or to do jobs which previously couldn't be done at all. And *our* function is not only to develop and produce these special alloy steels, but to engineer and design them to meet your particular requirements.

Allegheny Ludlum *Specialloy Service* covers the world's broadest range of corrosion and heat-resisting steels, tool and die steels, electrical, valve and nitriding steels, and carbide metals. Among them there's an answer to *your* design or production problems, and our Sales Development and Technical Staffs exist for the purpose of helping you find it. *Call them in to consult with you.*

ALLEGHENY LUDLUM

STEEL CORPORATION, Pittsburgh, Pa.

AL

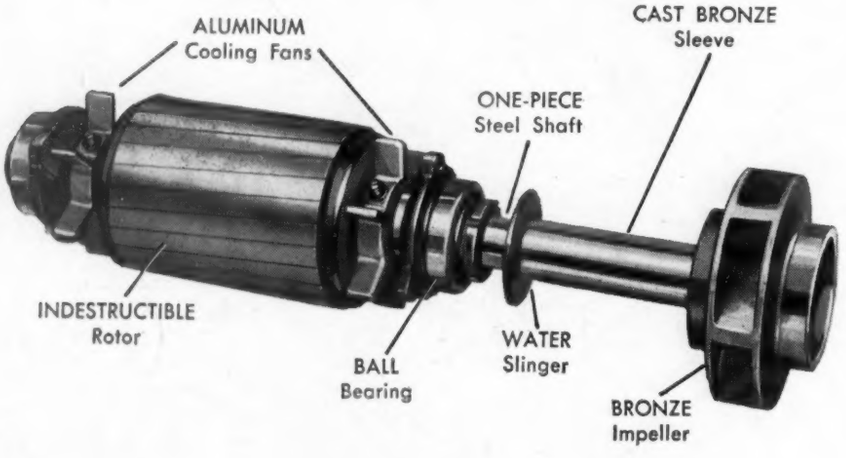
Pioneer in Specialloy Steels

W & D 263

Here's Key

to Why A-C's Smooth-Running Electrifugal Pump is the Finest of its Kind!

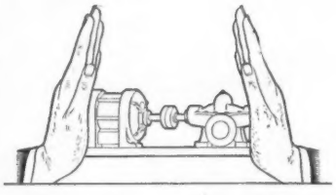
SQUEEZE PLAY CUTS SPACE 33%!



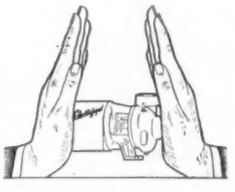
NEW KIND of pumping power now gives you new standards of performance and economy! Allis-Chalmers engineering has combined pump and motor into a single, compact unit—the "Electrifugal" Pump—which takes less space, gives you smooth operation with maximum protection against dangers of abnormal wear, leakage, corrosion, vibration! One-piece iron casting forms motor yoke, bearing housing, pump bracket and feet. One shaft running on 2 ball bearings carries the motor-rotor and pump impeller (see above). Result: true alignment, smooth operation—less maintenance! For you that means extra strength, extra value in terms of operating economy and long life. For complete information about this great pump, call our nearest office, or write ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

HEAR THE BOSTON SYMPHONY: *Saturday, American Broadcasting Co.*

A 1933



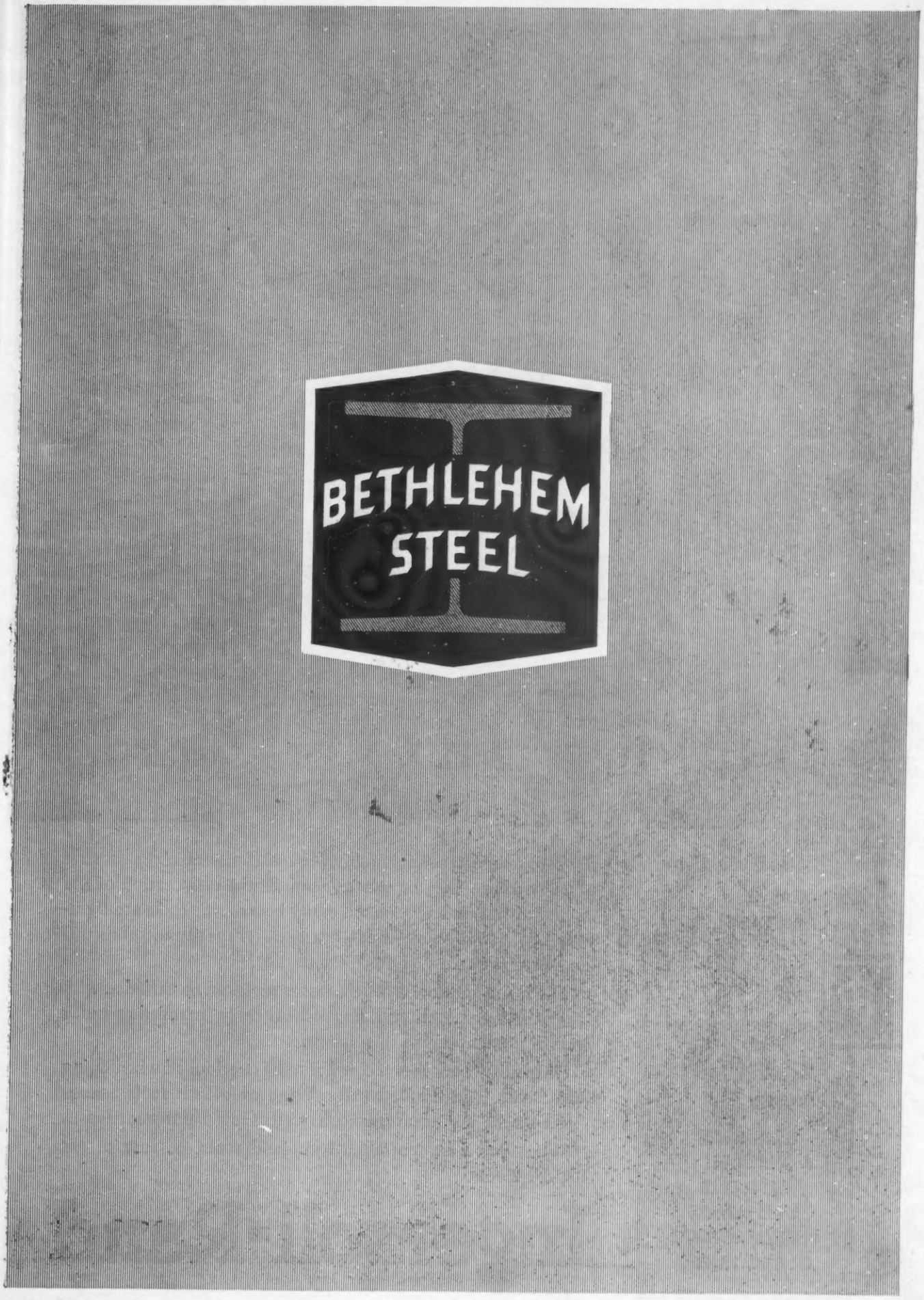
PROBLEM: Here is conventional pump and motor. How can we couple them together *better*—to save space, increase stability, and provide rigid alignment.



SOLUTION: We design a new kind of pumping unit—the one and only "Electrifugal" Pump! Motor and pump are now on one shaft—which cuts space 33%, assures alignment and smooth operation. No wonder "Electrifugals" give you more pumping power for your money!

SEA-BLUE BEAUTY: Modern design of Electrifugal Pump looks well on jobs anywhere! Capacities from 15 to 1600 gpm—heads up to 500 feet.

ALLIS-CHALMERS *Electrifugal* PUMPS


BETHLEHEM
STEEL

By fast we mean the air tool has the job finished in the shortest possible time. This, of course, requires the cooperation of the operator, but that is obtained easily because air tools are lightweight—*less fatiguing*—safe—increase his capacity and ability to do better work.

The speed and torque of air-motor tools can be varied at will. They can be started and stopped instantly, permitting quick spotting on repetitive operations.

Durability is another factor not to be overlooked when doing jobs faster. The simple sturdy design of I-R air tools assures "stick-on-the-job" performance as well as low maintenance costs.

When you need portable, hand-held tools, be sure to get I-R Air Tools.

Ways to do it

AIR TOOLS
COMPRESSORS
CONDENSERS
ROCK DRILLS
TURBO BLOWERS
CENTRIFUGAL PUMPS
OIL & GAS ENGINES

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y. 8-813

He's making it swallow its own tail

A typical example of B. F. Goodrich development in rubber

FOR years, belts were a terrible headache in paper mills — as well as a lot of other places. Metal fasteners, laces and other devices were used to join the two ends of the belt and make it endless. But the belts tore loose at the joints, slipped on the drive, failed to transmit power. Then the machinery had to be stopped while a new joint was made — sometimes as often as every 10 days.

Then B.F.Goodrich engineers developed a way to make each end of the belt a part of the other end. It's called the Plylock Belt Joint because the plies of rubber and fabric are actually locked together by overlapping, then vulcanized to make the joint permanent. The result is a joint that is 3 times stronger than metal fasteners; that will outlast them by as much as 10 times. Shutdown time for the machinery is sharply cut, production materially increased.

This is a typical result of the research and development that is always under way at B.F.Goodrich — on new products and old, for every industry. From tiny grommets to huge oil hose, from vibration dampeners to coal conveyor belts, no product is ever considered "standard" at B.F.Goodrich. Your supplier will be glad to work with you on any problem involving the use of rubber products by B.F.Goodrich. *The B.F.Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F. Goodrich

RUBBER *and* SYNTHETIC *products*

BEHIND THE SCENES

with Shrdlu

Postwar Bubble Gum

We great big grown up adults aren't the only ones who have been conscious of wartime shortages and the necessary substitution of inferior quality materials in certain favorite products. In talking with a friend over east last week, he told about his young son who came dashing into the house one evening and tore up the stairs three steps at a time to see his even younger brother. The ensuing conversation, which the father overheard, ran something like this:

"Hey, Joe, guess what?"

"What?"

"Got some real bubble gum. It's the nuts."

"Prewar stuff?"

"Naw, this is postwar gum, and it sure is better than that stuff we've had during the war. It cracks good and loud and Mom won't care because it doesn't stick on your face like that other junk."

"Gee, that's swell."

Help On The Hupp

We're accustomed to getting all manner of requests for aid and information around this print shop, so we're calloused to all but the most surprising. However, this week we heard a call for help from an army lieutenant who owns a 1938 Hupmobile which apparently needs a little assistance. With complete faith in our ability to find the unfindable, he asks us with admirable aplomb if we couldn't please find him a few spare parts. We looked around the office, but about all we have are a few old electrotypes and three pieces of broken castings which came out of one of our presses one day when the operator got absent minded and dropped a ham sandwich on page 4. Anybody out there got an old Hupmobile, full of parts? Or better yet, an old Hupmobile garage, full of parts? We'll be glad to forward any information to the army lad who's sitting dejectedly beside his immobile Hupmobile.

We're Still Hearing About It

We are still getting reports on publicity from the outstanding job the editors did in preparing the 32-page report on "What Industry Expects in 1946." Demand for extra copies has been heavy, and at the time we had a lot of inquiries from various sources about it. What tickled us about as much as anything, though, was the fact that one columnist on a Cleveland newspaper thought it was so good that he ran a full column on it. Now that feat in itself isn't too unusual. The real meat of this story is that the Cleveland newspapers were on strike when our study came out, and in fact remained on strike for more than a month. This columnist ran his story on the study after publication was resumed —more than a month after the release!

Want A Copy?

That reminds us that there are still a few copies of the study hanging around here. If you would like an extra one or two, drop us a line and we'll be glad to oblige as long as our supply lasts. Now that the strike situation has begun to show signs of clearing all over, you will want to do a little more definite planning for the future. This study will help you a lot in doing just that job.

D.T.'s

With a bow in the direction of our contemporary, *Automotive News*, may we pass along the suggestion of a prominent automobile executive to the effect that industry's trouble these days might well be diagnosed as a case of "Delirium Trumans."

Peace, It's Wonderful

The end of the steel strike brings with it a lot of comfort for our editors. They have been under quite a strain for the past few weeks, up there on the news staff, as well as in all the outside offices beating about the newsfronts, trying to find out what might happen on the strike situation during the lapse between the time they wrote about it and you read it. We'll give credit where it's due, though, and point out the very excellent job News Editor Bill Rooney and his staff did in second guessing before the first guessing. Last week, for example, when he ran photos of Bowles, Porter and Snyder and gave them their correct titles in an article which led off the book and which went to press a good many hours before the White House made the announcement on the appointments. Brothers, get in off that limb!

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(Editorial Contents—Page 49)

Assembling Gears on Camshafts

...another Snap Job For

MULTIPRESS

THERE'S nothing better than *smooth, exactly controlled* hydraulic power for—among hundreds of other tasks—assembling gears on shafts . . .

MULTIPRESS provides that kind of power, *in a streamlined package so remarkably compact, efficient, versatile and economical* as to be a minor miracle in the machine tool field!

Results gained with MULTIPRESS in action right on the production line, as in the typical installation at left, prove this point.

Built in 4, 6, and 8-ton sizes, MULTIPRESS offers fully regulative ram pressures from 300 pounds to capacity. Ram strokes are adjustable from 1/32 of an inch to capacity. The 4-ton unit, for example, offers a full six-inch maximum stroke, weighs only 725 pounds, measures only 34 inches high and 16 inches wide, applies up to 8000 pounds pressure at 200 ipm downward, and delivers upward pressures up to 5000 pounds!

THE DENISON ENGINEERING CO.
1163 DUBLIN RD., COLUMBUS 16, OHIO

At the John J. Hart Company, Brooklyn, MULTIPRESS assembles gears on camshafts with speed, accuracy, and economy.

A FEW OF THE COUNTLESS TYPES OF OPERATIONS MULTIPRESS DOES BETTER AND FASTER

DRAWING

At the Buckeye Stamping Company in Columbus, Ohio, MULTIPRESS blanks and draws a complete metal container with each complete stroke of the ram!

TRIMMING

At the Universal Castings Corporation in Chicago, MULTIPRESS cuts trimming costs on aluminum, bronze and brass castings of close tolerance and high finish.

SLOTTING

Punching key slots in safety razor guards at Gillette's South Boston plant, MULTIPRESS cuts press "down time," boosts production, and reduces noise level.

MOULDING

Ceramic radiants formed by MULTIPRESSes at the American Clay Forming Company, Tiffin, Ohio. MULTIPRESSes increased production and reduced kiln loss.

STAMPING

At the American Electronics Corporation at Columbus, Ohio, small metal lugs are blanked and formed at high speed and low cost by specially tooled MULTIPRESSes.

Another unique MULTIPRESS *feature is the amazingly wide range of* standard *fixtures, tools, controls and accessories that can be attached quickly, easily and economically to the ingeniously designed* MULTIPRESS *frame. These include automatic cycling controls, straightening fixtures, indexing tables, controls for rapid ram traverse and adjustable pressing speed, benches, bolsters, extension tables, and a host of others! Get the complete* MULTIPRESS *story . . .* ***Write today!***

HydrOILic — INDUSTRY'S RIGHT HAND

DENISON
EQUIPMENT *in* APPLIED
HydrOILics

the pulverizer that didn't!

A 600 POUND DIE RING for a coal pulverizer smashed down on the toe of this Lehigh Safety Shoe. The crushing weight gashed the leather, but there was NO INJURY — toes were protected by the famous Lehigh Lockrim* steel toe box ● This accident-with-a-happy-ending is typical of case after case where Lehigh's rugged construction and extra margin of safety have helped to prevent serious injury or permanent disability even under terrific impact. ● If foot and underfoot hazards are a problem anywhere in your plant, write today for the new Lehigh catalog and prices.

*T. M. Reg.

LEHIGH SAFETY SHOE CO. • INC. ALLENTOWN, PA.

DOES THINGS

no other type of materia handling equipment can do

While you're figuring on correcting your material handling and storeyard problems think about such things as versatility, expansion, types of materials you may be having to handle some months ahead, changes in construction about the plant and the other things that affect the movement of raw materials in and finished materials out of your shop.

No other type of equipment can do the things a Northwest will do. It handles any of the fifteen or twenty material handling devices that can be attached to a cable from a hook block to a magnet. It goes anywhere about the plant. It handles any kind of material, loads or unloads trucks or railway cars, piles or tiers material, pulls cars, reaches overhead loading platforms or doors and handles all construction or excavation jobs.

The Northwest brings you a simplicity of design that makes upkeep easier, the "Feather-Touch" Clutch Control that takes the back breaking labor out of operation, assures the safety and accuracy that come with the feel of the load. Uniform Pressure Swing Clutch eliminate the jerks and grabs in swinging and reduces adjustment. Ball and Roller Bearings assure the maximum delivery of power to the operations and many other Northwest features combine to cut operating and maintenance costs. When you invest in equipment in the immediate years ahead, you want the best you can get. Check up on the details before you order. There is a capacity for every problem.

Let's get acquainted
INVESTIGATE THIS *Different* CRAWLER CRANE

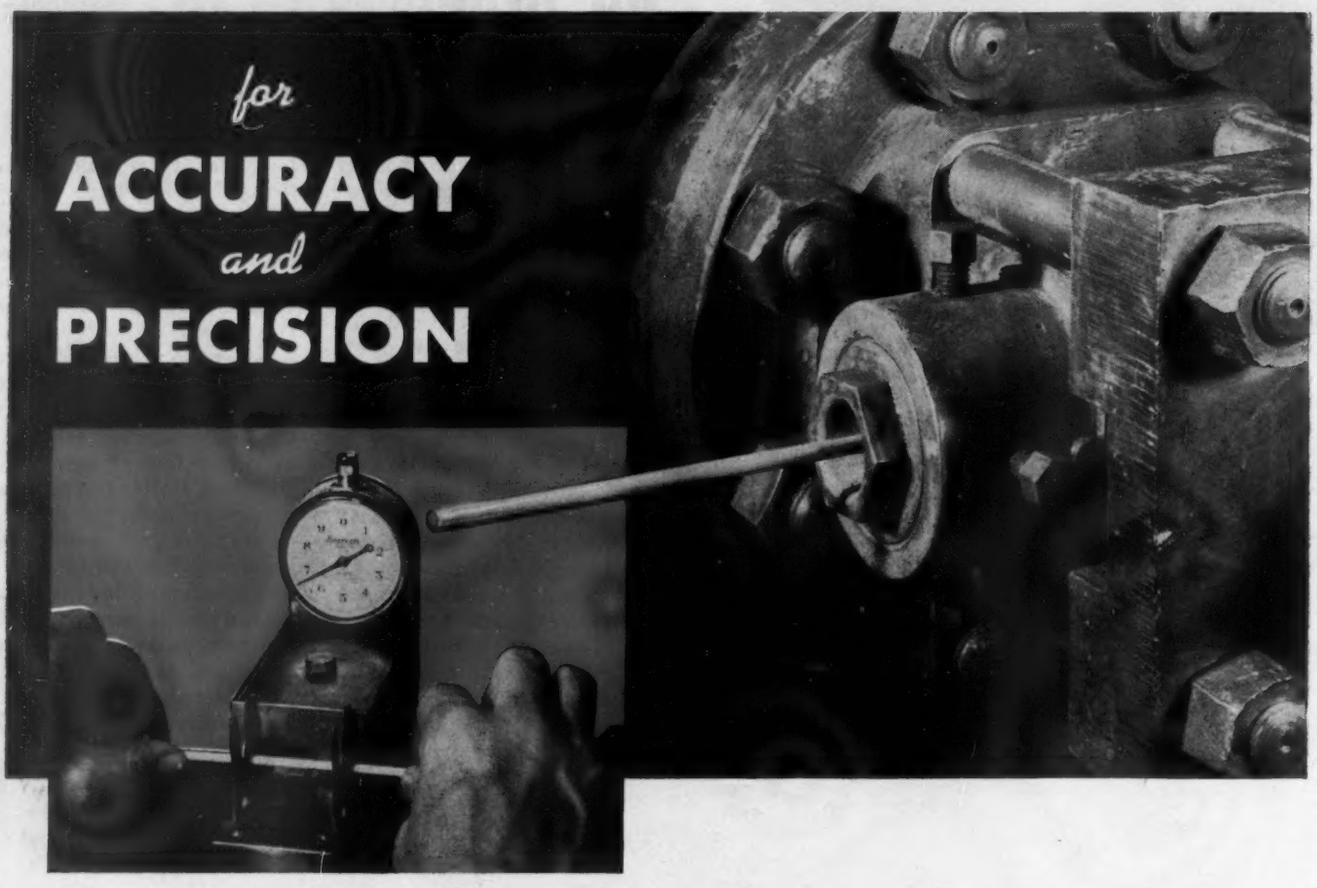
NORTHWEST ENGINEERING COMPANY, 1805 Steger Bldg., 28 E. Jackson Blvd., Chicago 4, Ill.

NORTHWEST *The Crane that goes Anywhere*

EXTRUDED...

for

ACCURACY *and* PRECISION



Extruded Electrodes for Welding:

- Stainless Steel
- Tool and Die Steels
- Heat Resisting Alloys
- Bronze, Brass. and Copper
- Cast Iron
- Monel
- Nickel

EXTRUDED welding electrodes are the product of a modern machine age that takes full advantage of the continuous accuracy and precision which only a machine can achieve.

The coating of extruded electrodes is concentric with the core wire and uniform in thickness from end to end. Furthermore, the alloys in the coating are evenly distributed thus insuring a weld deposit of a uniform chemical analysis.

For confidence in quality and uniformity of performance—use extruded electrodes by Alloy Rods Company.

ALLOY RODS COMPANY — **YORK, PA.**

Alloy Rods Co. York, Pa.

Arc Furnace Troubles?—

FAULTY ELECTRODE ACTION HANDICAPS FURNACES—PREVENTS EFFICIENT OPERATION. THE REMEDY IS FAST-ACTING "REGULEX" CONTROL:

☛ "Regulex" rotating control accurately controls electrode position during all the changing conditions of the furnace charge, resulting in greater furnace output per kwh input.

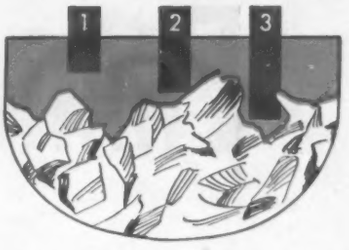
☛ The "Regulex" control system is able to adjust itself instantly to any demand, no matter how small or how large—through sensitive variable-voltage control.

☛ The "Regulex" generator is a sturdy, standard commutator machine, which requires no tricky brush adjustments. Since no springs, levers or contactors are used in the control scheme, maintenance is slashed!

☛ As a unique A-C feature, "Regulex" control can be equipped with flywheels, which automatically raise the electrodes when a-c power fails. The auxiliary generator can make the entire control independent of a d-c shop source when desired.

☛ Your arc furnace manufacturer will be glad to tell you about "Regulex" control for new or existing furnaces. Or write directly to ALLIS-CHALMERS, MILWAUKEE 1, WIS.

Six Conditions "Regulex" Corrects by Fast Action

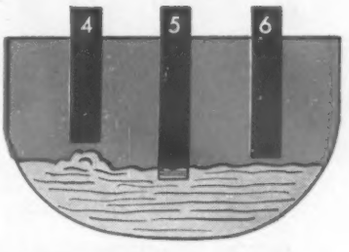


MELTDOWN PERIOD

1. **REPEATED ARC INTERRUPTIONS,** due to sudden "settling" of metal. Sensitive "Regulex" generators reduce arc restrikes—thus meltdown time—by continuous, accurate adjustments.

2. **INSTABILITY OF ARC,** due to inaccuracy of control for raising electrode when short circuit occurs. "Regulex" variable voltage control raises electrodes *just the right amount*—keeps arc values constant.

3. **BREAKAGE OF ELECTRODES,** caused by caving in of metal charge against electrodes. Fast-acting "Regulex" control pulls electrodes safely out of a cave-in. "Regulex" generators also conserve electrodes by reducing number of arc restrikes—thus limiting mechanical shock to electrodes.



REFINING PERIOD

4. **WASTE OF POWER,** as a result of current surges when metal boils up against electrodes. "Regulex" variable voltage control raises electrodes with acceleration directly proportional to amount that arc current and voltage deviate from normal values . . . lower power input results.

5. **FREEZING OF ELECTRODES** in molten bath, due to electrode "drift" when a-c power fails. Only the "Regulex" generator set is provided with a flywheel for automatically raising electrodes upon a power failure . . . preventing electrode breakage, and carbon contamination of the molten metal charge.

6. **BURNING OF ELECTRODES** during refining period, because of using too short an arc. Accurate "Regulex" control permits use of longer arc—conserves your arc furnace electrodes.

Allis-Chalmers

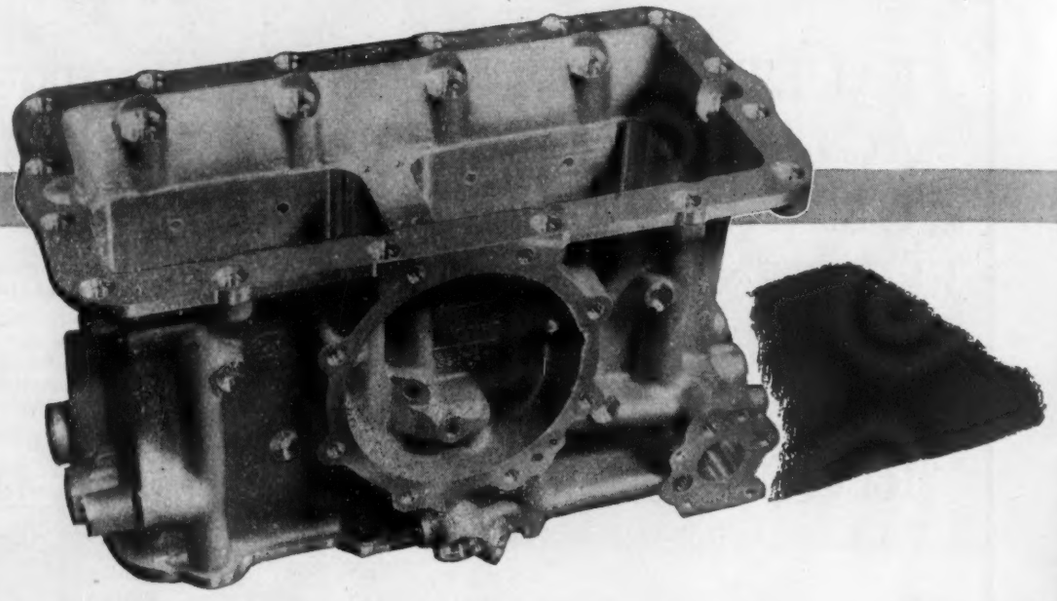
"REGULEX"

Arc Furnace Control

A 1939

HEAR THE BOSTON SYMPHONY: *Every Saturday Evening, American Broadcasting Co.*

Eliminates Hand work on



"IT WOULD have been extremely difficult to build carburetors to the high standards set by the Army Air Corps if it had not been for the lead screw Tapping & Threading Machines produced by Warner & Swasey," reports the Illinois Division of Bendix Aviation Corporation, Chicago.

One example of the work done at Bendix on Warner & Swaseys is a complicated magnesium casting used as a throttle body for an aircraft carburetor. This part calls for 8 holes tapped 5/16"- 18, 5/8" deep to a Class 4 fit and 16 holes tapped 7/16"- 20, 3/4" deep to a Class 4 fit. Because these tapping operations are near the completion of the machining process on the part, error in any tapped thread would result in costly scrap loss.

Today, Bendix taps these threads completely by machine—eliminating all hand work and reducing the human error element to an absolute minimum. The result: better production, far lower scrap loss on a tough job!

What Warner & Swasey Precision Tapping & Threading Machines have done here and in dozens of other plants in war production, they can do for you in getting better peacetime products at lower costs. We'll be glad to make test runs of sample parts to show you what these machines can do!

YOU CAN MACHINE IT BETTER, FASTER, FOR LESS . . . WITH A WARNER & SWASEY

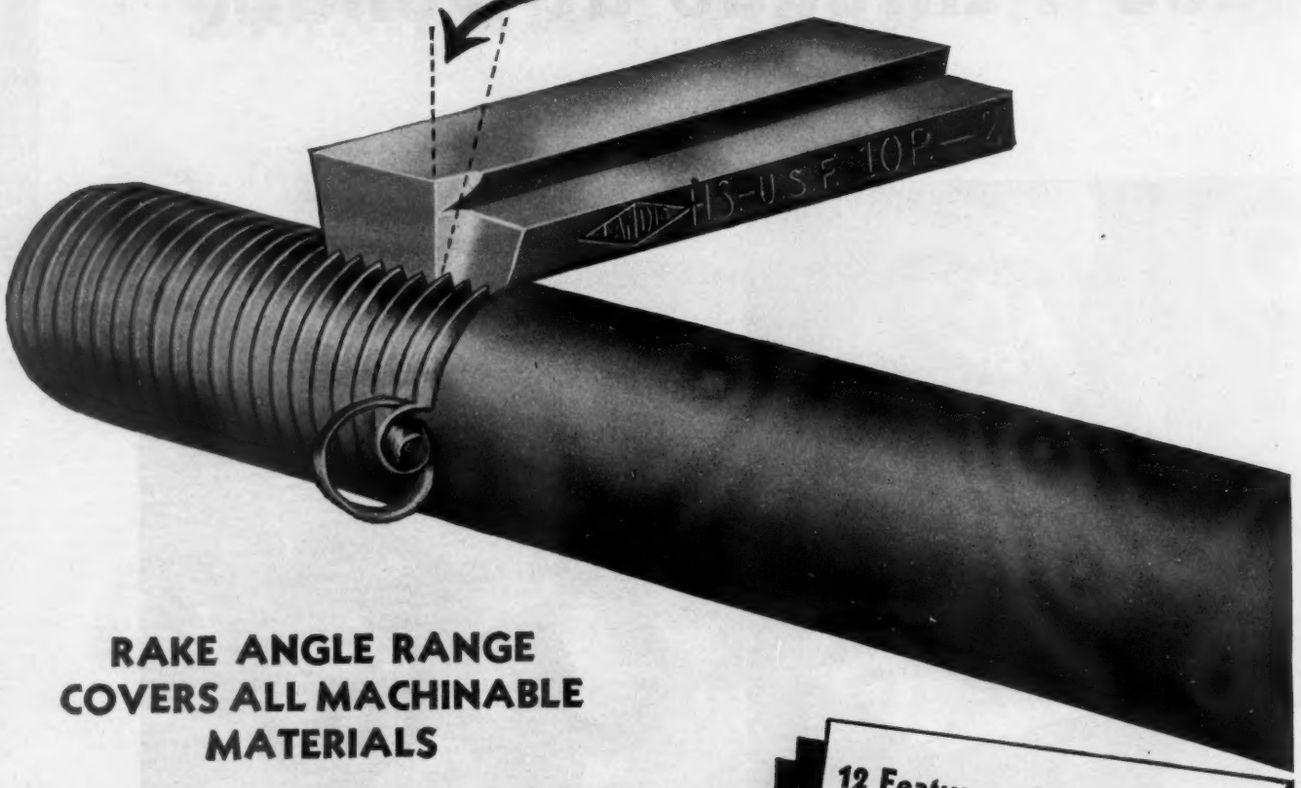
Class 4 threads at Bendix

● *Tapping 8 holes to a Class 4 fit, 5/16"-18 thread in magnesium on No. 11 Warner & Swasey Precision Tapping & Threading Machines.*

TURRET LATHES, SADDLE AND RAM TYPES – CHUCKING AND BAR TOOLS – MULTIPLE SPINDLE AUTOMATICS – PRECISION TAPPING AND THREADING MACHINES

WARNER & SWASEY
Machine Tools
Cleveland

With the **LANDIS** *Chaser – Thread Quality is Assured by the Variable* **RAKE ANGLE**



RAKE ANGLE RANGE COVERS ALL MACHINABLE MATERIALS

The rake of the Landis chaser is variable, ranging from 5° negative to 35° positive.

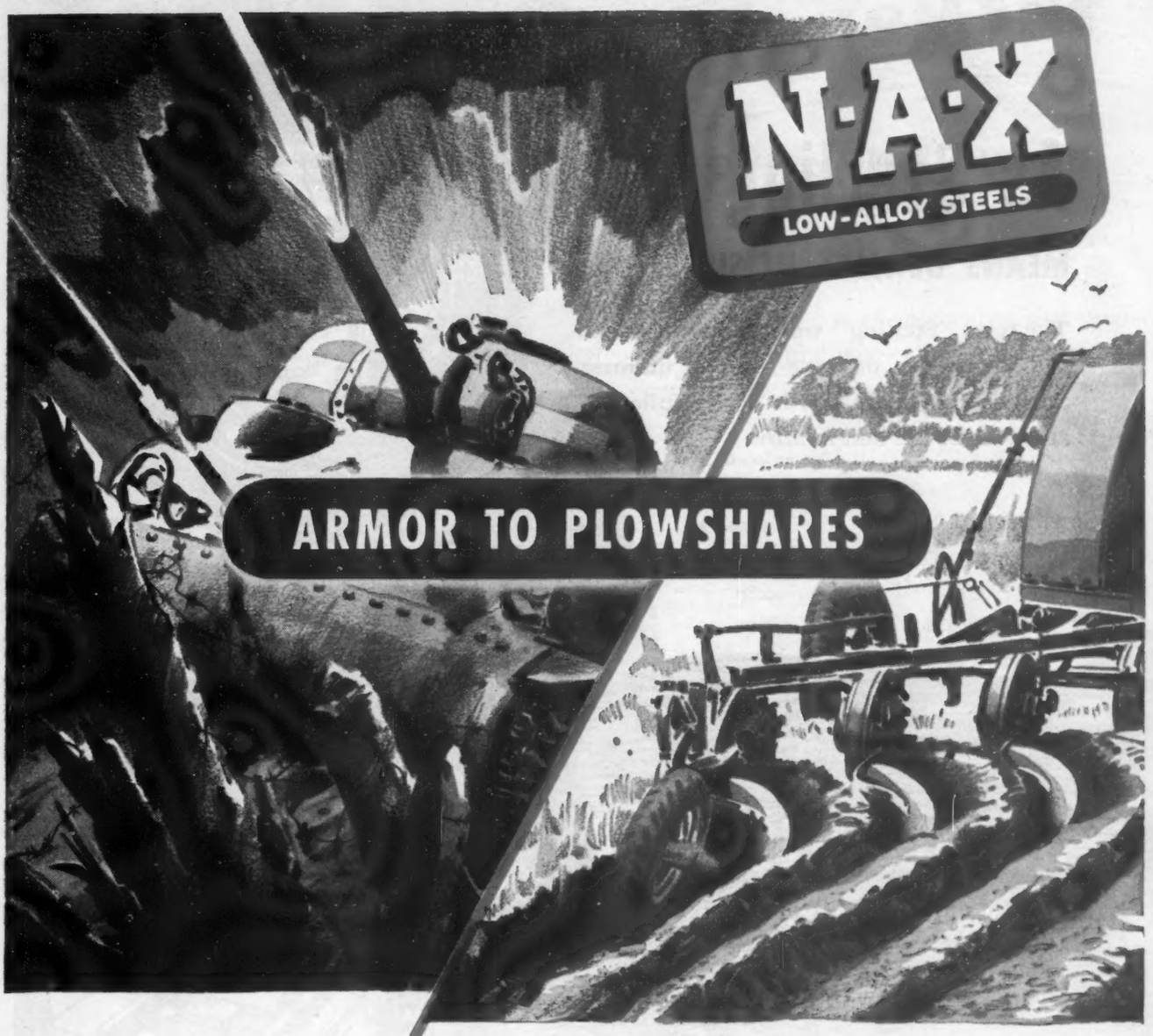
This variable rake permits the use of the suitable cutting angle for each machinable material and assures the production of cleanly cut and correctly formed threads.

12 Features of the LANDIS TANGENTIAL CHASER

1–Permanent throat permits close to shoulder threading throughout life of chasers
2–Rake angle range covers all machinable materials
3–Free cutting condition permits maximum cutting speeds
4–Simple grinding operation renews entire cutting edge and leading feature
5–Line contact with work lessens friction and minimizes thread distortion
6–Leading feature insures thread of accurate lead
7–Lateral absorption of cutting strain reduces vibration and chaser breakage
8–Right and lefthand threading feature reduces chaser equipment
9–Standard chasers thread all diameters with proper chaser holders
10–Interchangeability of chasers lowers operating cost
11–Chaser length provides exceptionally long life and low tool cost
12–Permanent throat gives equal distribution of cut

LANDIS
MACHINE COMPANY
WAYNESBORO, PA., U.S.A.

THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS



It has already happened. . . . One of the fine-grained N-A-X low-alloy steels — steels that have provided armor for tanks and landing craft, frames for all jeeps, and vital parts for scores of fighting vehicles — has been "beaten into plowshares" to produce priority equipment for agriculture.

The particular steel was N-A-X 9120, a carburizing grade. Its ready response to carburization and heat-treatment is utilized to produce a farm implement that is "tough to the core" and that has the required surface hardness to resist abrasion and wear.

The conversion of an N-A-X low-alloy steel from tools of war to tools of peace is not surprising . . . just prophetic. For the same wide range of desirable properties that made these fine-grained steels a great military material recommends their use in civilian products.

GREAT STEELS FROM GREAT LAKES

GREAT LAKES STEEL
Corporation

N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN

UNIT OF NATIONAL STEEL CORPORATION

As Sterling

MEANS *QUALITY* IN SILVER . . .

The term "Sterling" was originated in the 13th century to describe coins of uniform fineness and quality. It is now applied to all silver of the best *quality.*

So Granite City

MEANS *QUALITY* IN STEEL

Since 1876 "Granite City" has meant steel tailor-made to the user's specifications, produced by a plant large enough to employ the most modern equipment and methods, small enough to prevent any compromise with *quality.*

Granite City Steel Co.

GRANITE CITY, ILLINOIS

Chicago • Cleveland • Houston
Indianapolis • Kansas City
Los Angeles

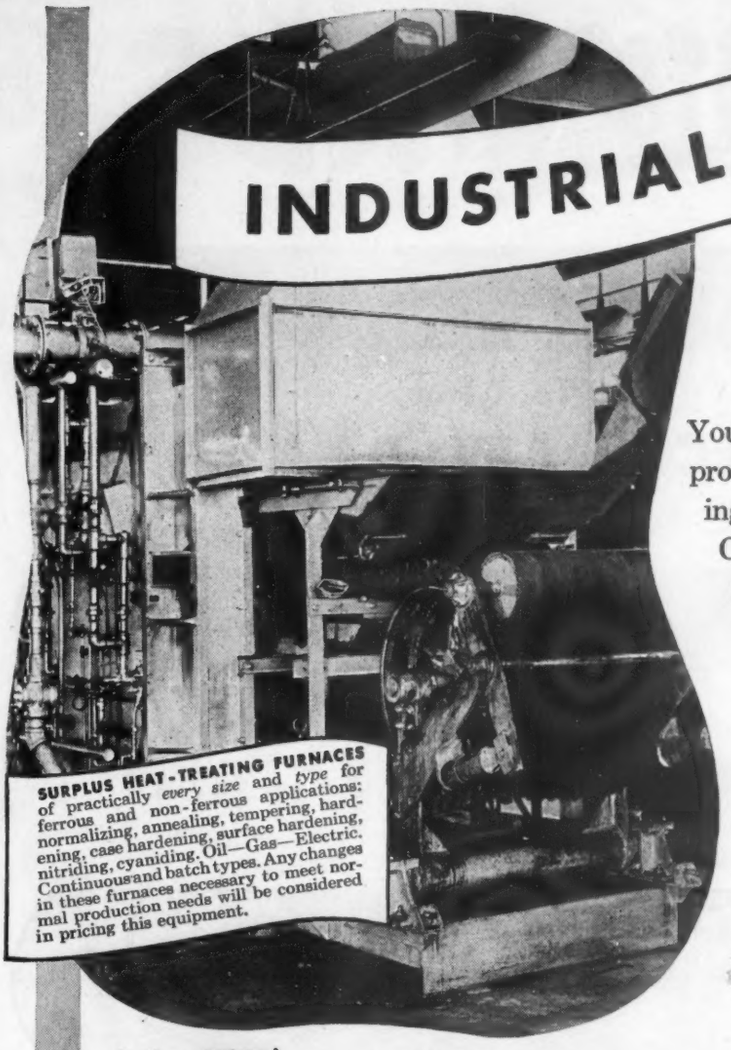
SINCE
GRANITE CITY STEEL
1878

Milwaukee • Memphis • Minneapolis • Moline • New York
St. Louis

HOT ROLLED SHEETS • COLD ROLLED SHEETS • STRIPLATES • STAINLESS-CLAD • TIN PLATE • TERNE PLATE • ELECTRICAL SHEETS • TIN MILL PRODUCTS • PORCELAIN ENAMELING SHEETS

INDUSTRIAL EQUIPMENT

GOVERNMENT-OWNED SURPLUS *FOR SALE*

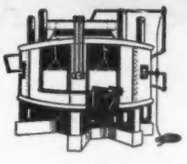


SURPLUS HEAT-TREATING FURNACES of practically *every size* and *type* for ferrous and non-ferrous applications: normalizing, annealing, tempering, hardening, case hardening, surface hardening, nitriding, cyaniding. Oil—Gas—Electric. Continuous and batch types. Any changes in these furnaces necessary to meet normal production needs will be considered in pricing this equipment.

You can acquire *now* at good value, long needed production equipment—such as the heat treating furnaces shown in this advertisement. Check your operations today. Find out where additional or replaced equipment would cut your costs or speed processing. Then go over your needs with your nearest War Assets Corporation Regional Office*. From the vast quantities of surplus industrial equipment on hand you will be able to pick, in all likelihood, exactly what you need at a very low price.

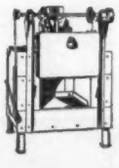
**ROTARY HEARTH*

For heat treating in production operations. Semi-automatic operation and control.



**TEMPERING FURNACE*

For tempering small work in production or for the tool room or laboratory.



**INDUCTION HARDENER*

The latest development in controlled surface hardening by high frequency induction. A complete heat-treating unit that can be spotted strategically in the production line.

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VETERANS OF WORLD WAR II: To help you in purchasing surplus property from War Assets Corporation, a Veterans' unit has been established in each of our regional offices.*

CHECK THIS LIST FOR THE EQUIPMENT YOU NEED

Without obligation, make sure your name is on the list for complete information on the types of industrial equipment you need. Simply mail this coupon.

- ☐ Heat-treating furnaces (for all purposes)
- ☐ Gantry type cranes
- ☐ Extrusion Presses
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- ☐ Centrifugal and rotary pumps
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- ☐ Chemical equipment
- ☐ Thermal dryers-dehydrators
- ☐ Generator sets (internal combustion engine driven)
- ☐ Baling presses
- ☐ Electric copper cable
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- ☐ Bonded and coated abrasives
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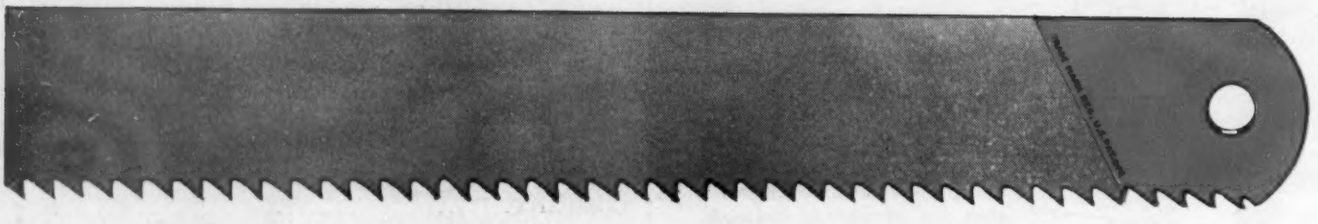
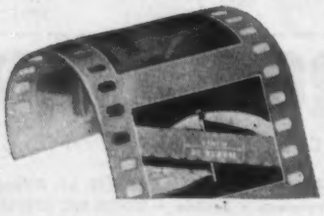
Get SIMONDS

"RED END" HACKSAW BLADES

. . . AND GET A LONGER RUN

FOR YOUR MONEY





SEE SIMONDS SOUND-FILM, in color, showing how to get the best results and longest service out of the finest blades made . . . SIMONDS "Red End" Blades for Hand and Power Hacksawing. You can arrange with your Industrial Supply Distributor for a showing of this interesting movie. Or write to the nearest Simonds office.

SIMONDS
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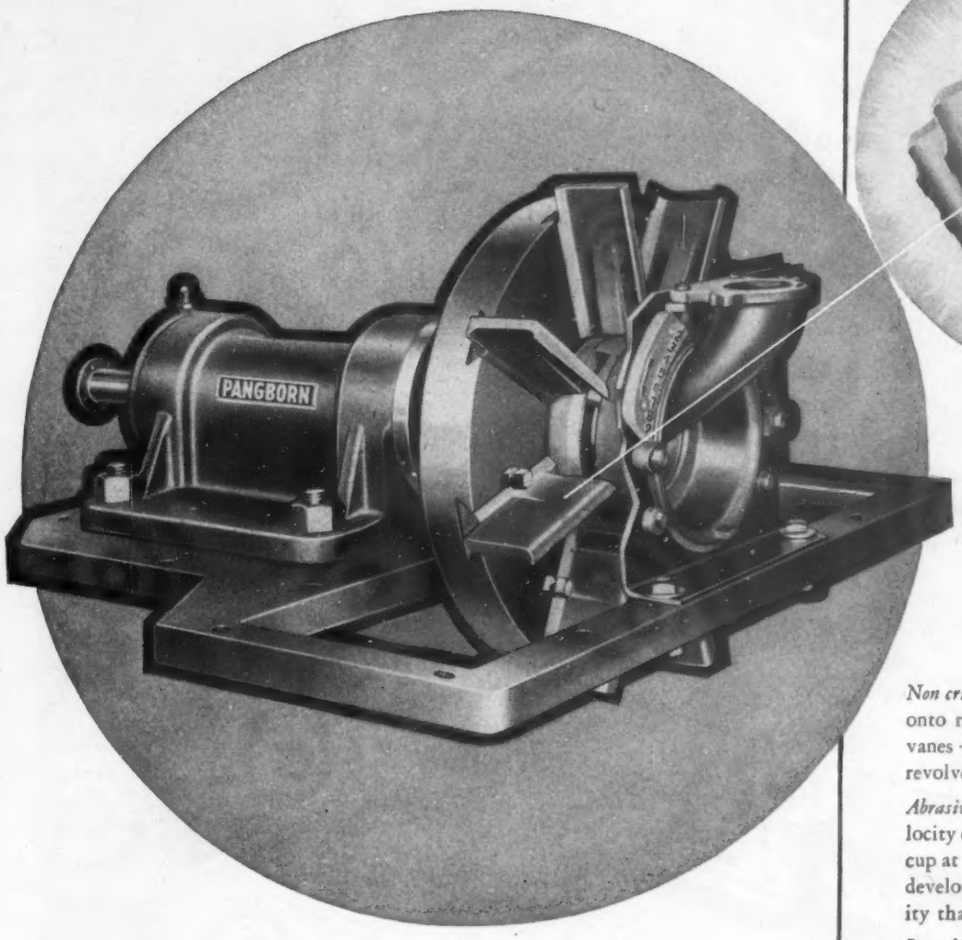
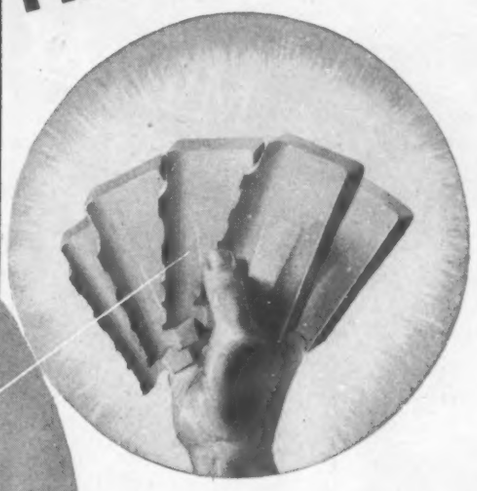
BRANCH OFFICES: 1350 Columbia Road, Boston 27, Mass.; 127 S. Green St., Chicago 7, Ill.; 416 W. Eighth St., Los Angeles 14, Calif.; 228 First St., San Francisco 5, Calif.; 311 S. W. First Ave., Portland 4, Ore.; 31 W. Trent Ave., Spokane 8, Wash. *Canadian Factory:* 595 St. Remi St., Montreal 30, Que.

THE VANE COMES OUT LIKE A KEY FROM A LOCK





No other Airless Blast Machine has this Time-Saving Feature. Because removing wedged worn vanes is a big item in the maintenance of an airless blast machine, Pangborn designed its vanes for quick, easy removal. Instead of threaded parts which collect abrasive and tend to lock—the Pangborn Quick-Removable Vane is attached to the head plate by a lock pin. Just remove the lock pin — and slide out the vane.

You save *replacement time* because the worn vane is out and a new one in, in no time.

And these other

PANGBORN FEATURES

save you more time and money

Non crush abrasive feed. Abrasive is fed onto rotating vanes in synchronism with vanes — no crushing as when impellers revolve inside stationary control cage.

Abrasive acceleration. Because of initial velocity of abrasive feeding to vane from feed cup at 40 to 50 feet per second, ROTOBLAST* develops greater abrasive peripheral velocity than any other airless method.

Long-life, one-piece special alloy head plate. Made to same specifications as vanes. Service life up to 3,000 hours, depending on nature of work and abrasive.

Low-cost abrasive feeding mechanism. Simple parts are inexpensively replaced.

Send coupon for Bulletin 211A on ROTOBLAST Tables — single and multiple spindle. For any type of blast-cleaning equipment — airless or compressed air — "Come to Pangborn," *world's largest manufacturer of blast cleaning and dust control equipment.*

*Trademark of the Pangborn Corporation

Pangborn

PANGBORN CORPORATION, HAGERSTOWN, MARYLAND

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Company .....

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these MO-MAX high speed steels

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"MOHICAN"	ATLAS STEELS, LIMITED
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"MOLITE M-1"	COLUMBIA TOOL STEEL CO.
"REX T-MO"	CRUCIBLE STEEL CO. OF AMERICA
"DI-MOL"	HENRY DISSTON & SONS, INC.
"HI-MO"	FIRTH-STERLING STEEL COMPANY
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"MOGUL"	JESSOP STEEL COMPANY
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	ST. LAWRENCE ALLOYS, INC.
"S. T. M."	SIMONDS SAW & STEEL COMPANY
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For the full story on MO-MAX high speed steels—their physical properties, their advantages, and how to heat treat them—write today to Department D for the new, revised MO-MAX Handbook.

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For almost half a century UNITED has been identified with the latest practice and highest standards in design and construction of Rolling Mills and related apparatus. Pioneers of many "firsts" in steel making, UNITED'S engineers are singularly fitted, by experience and training, to deal intelligently with problems of the rolling industry.

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★ *The World's Largest Designers and Makers of Rolls and Rolling Mill Equipment*

ANY REFRACTORY SHAPE YOU NEED

—easily made with Refractory Concrete!

A few of the interesting Refractory Concrete shapes made by Kolb Refractories Co., Philadelphia, Pa.

INTRICATE UNITS AND MATCHING PIECES ARE TRUE TO SIZE, UNIFORM, FREE FROM DISTORTION

You can benefit in two ways by using Refractory Concrete, made with LUMNITE, for special shapes. *First*, you have wide freedom in designing shapes to fit your needs. *Second*, you can get high-quality shapes without delay.

FREEDOM OF DESIGN—The shapes are cast in molds to the size and form required. There's no prefiring, so no distortion or warpage. Sharp corners, smooth surfaces and accurate dimensions insure the fit of matching and interlocking pieces.

NO DELAY—Shapes of Refractory Concrete can be installed or piled in stock within 24 hours after casting. The cold-setting binder, LUMNITE, insures high strength—without firing.

For information on Refractory Concrete—for precast units or cast-in-place walls and arches—write The Atlas Lumnite Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York 17, N. Y.

LUMNITE FOR REFRACTORY CONCRETE

WHERE YOU DO THE SAME JOB

AGAIN *and* AGAIN *and* AGAIN...

Thor

HIGH FREQUENCY TOOLS

Step Up Output at Lower Cost

Operating on 180 cycle current, Thor High-Frequency Electric tools maintain virtually *constant speed* under load; have *more power* per pound; are light, compact and *easier to handle.* These characteristics provide extra efficiency for increased production with less cost. Running at unvarying, full-rated speed, the tools deliver greater work and power output in relation to power input . . . reducing operating cost. Maintenance costs are lower, too, because Thor high-frequency tools are made with fewer motor parts—all extremely simple and subject to little wear.

Generally, these benefits are realized *most* on mass production operations. If you use a total of ten or more tools—for drilling, reaming or tapping; grinding, sanding or polishing; screw driving or nut setting—a Thor engineer can show you how Thor High-Frequency Electric Tools will *pay* you on every job. Call your nearby Thor branch.

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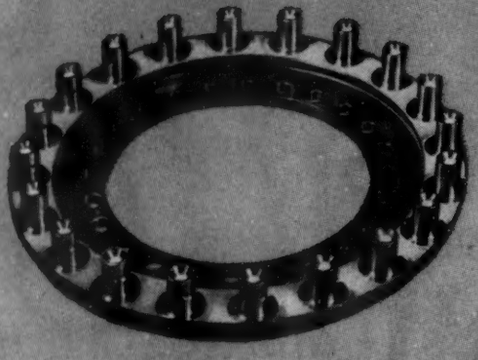
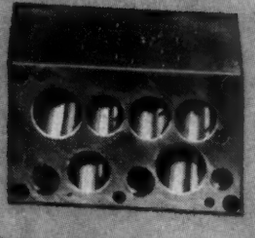
Thor **PORTABLE POWER TOOLS**

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

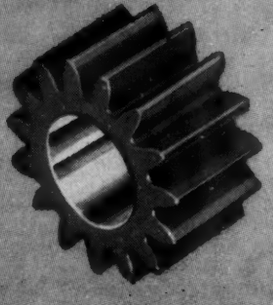
What Cost— a BORE?





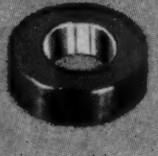
Bores—millions of bores—dowel pin bores—bearing bores—engine cylinder bores—all these and other bores, essential to high quality products—require low cost manufacturing techniques as well as precision.

Industry has always had to spend a lot of its time and money generating precision in bores. Specifications and standards continually become stiffer. Available methods have produced good technical results but they have usually cost too much in time and money.



Microhoning — the modern hone abrading method has recently developed new controls which, at production speeds, generate sufficiently high accuracy and size precision to make possible complete interchangeability of all duplicate parts. Selective fits are no longer necessary when microhoning becomes the final machining process.

Stock removal is at high rates. From .010" to .080" of stock may be removed by Microhoning at rates from .006" to .008" per minute.



If you face new standards of precision in bores which look impossible, investigate Microhoning. It has provided the means to meet many "impossible" demands.

MICRO MATIC

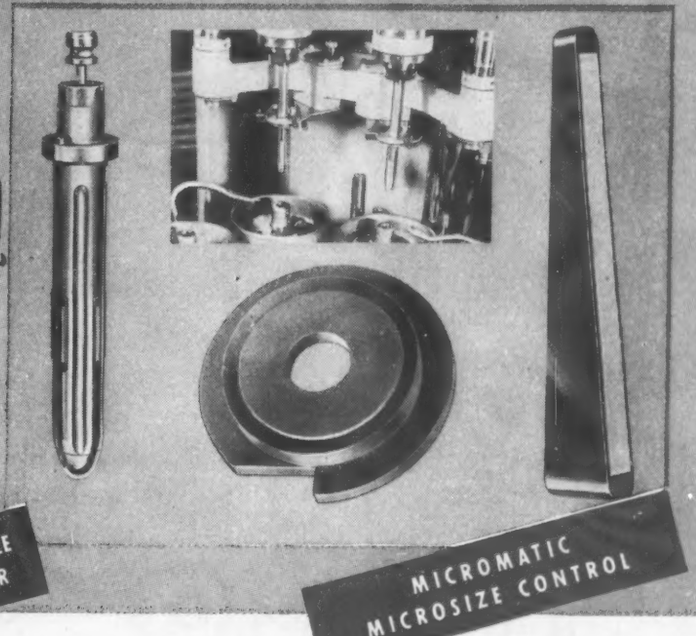
MICROMATIC HONE CORPORATION

DETROIT 4, MICHIGAN

These Machines Produce *Precision Bores* FAST

Micromatic Honing Machines and Honing Tools are built to meet a wide range of Microhoning needs. They provide any desired precision—dimensional accuracy—roundness and straightness in bores—at high production rates.

MICROMATIC MODEL 705 MULTIPLE SPINDLE VERTICAL HYDROHONER



MICROMATIC MICROSIZE CONTROL

Has built-in automatic Microsize Control. For internal honing. Rotary indexing work table provides high production. Usually recommended for maximum stock removal ranging from .0005" to .0015" on hardened parts—.001" to .010" on soft or medium hard. Bores from ¼" to 2" diameter. Microsize control gauges work automatically. Work is held uniformly within tolerances of .0003". Honing cycle is automatically stopped when correct size is reached. Automatically holds size within limits of .0001" to .0003" in most applications.

Micromold Honing Sticks are expanded as the tool is honing the bore in combined reciprocating and rotary motion. The expanded sticks act as a plug gage within the selective sizing ring.

As soon as the sticks expand enough to bind on the inner surface of the sizing ring, the ring turns automatically shutting off the machine.

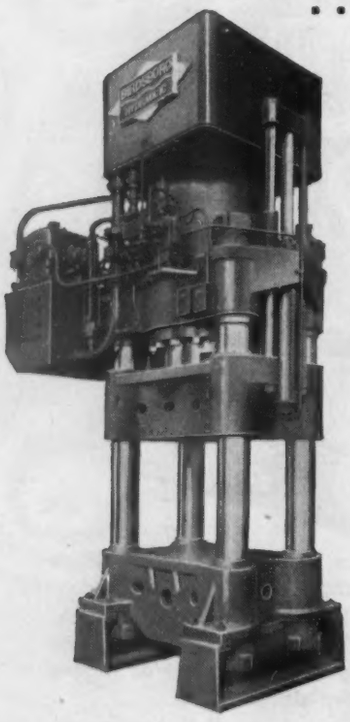
MICROMATIC HONE CORPORATION

DETROIT 4, MICHIGAN

DISTRICT OFFICES: 614 Empire Building, 206 South Main St., Rockford, Illinois • 129 Church St., New Haven 10, Connecticut
501 Harries building, 137 North Main St., Dayton, Ohio • 1031 South Broadway, Los Angeles 18, California

Look for this TRADE MARK

. . . It's Your Key to Greater Press Value



Because purchasing a hydraulic press is a major investment for even a large company, the trade mark is a vital key in making sure the investment is a sound one.

At Birdsboro, we like to think of the trade mark as symbolic of trained engineers constantly at work improving the designs of Birdsboro high speed presses to make them produce more parts per hour . . . to make them safer, easier to use . . . to make them cost less to maintain. Thousands of satisfied users in the aircraft and allied industries testify to our success in providing greater press value per dollar invested.

So look for this when you're in the market for hydraulic presses. We'll be glad to put our experience to work on your next hydraulic press problem.

BIRDSBORO STEEL FOUNDRY AND MACHINE COMPANY • BIRDSBORO, PA.

BIRDSBORO
HYDRAULIC PRESSES

Exceptional HEAT UNIFORMITY

...with MAEHLER ovens...

. . . mean more uniformly baked cores

RECENT TESTS SHOW . . . temperature variations of only 5°

93.6%
OF MAEHLER'S PRODUCTION
IS DEVOTED TO REPEAT ORDERS!

. . . . . There is no better proof of the superiority of Maehler ovens and furnaces.

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MAEHLER'S leadership in developing the recirculating air heat system for industrial ovens has resulted in a line of equipment that gives heat uniformity that is virtually *perfect!* Recent tests show that a Maehler oven operating at 500°F fully loaded maintained a heat uniformity within 5°, through high volume and rapid air heat circulation and highest grade instruments. This kind of temperature control means uniform baking . . . no under-baked nor over-baked cores.

Maehler core and mold ovens are available in a complete range of oil fired, gas fired and electrically heated units, incorporating the Maehler recirculating principle for high uniformity and output, at low cost.

Let us quote you on your requirements.

THE PAUL MAEHLER COMPANY
2208 W. Lake Street • Chicago 22, Ill.

MAEHLER

Industrial Ovens and Furnaces for Core Baking, Mold Drying, Heat Treating, Enameling, etc.

With a THEW-LORAIN you can *Go and Get It!*

Now Industrial Plants can have the Correct Mounting plus Front End Interchangeability

CRAWLER—The crawler mounting won't travel your unit as fast as "rubber" mounting, but you can bet it will take your machine anywhere you need it—over roughest, toughest going and up steep grades. Lorain Crawlers provide 2 speeds both in forward and reverse. Operator can steer in either direction or pivot turn with the turntable swing in any position. With a Lorain Crawler you have power and traction combined with usual maneuverability.

MOTO-CRANE—Lorain Moto-Cranes, with their high mobility, are ideal for serving big areas and widely separated variable jobs. These are rubber-tired, two-engine units. Turntable unit powers all shovel-crane operations. The chassis engine propels the entire unit—up to 30 M.P.H. on the road—and with ample low-speed power for off-the-road going or heavy tows, moving cars, equipment, etc. Six wheeler units, with choice of 4-wheel or 6-wheel drive.

SELF-PROPELLED—In this popular unit a single engine powers all shovel-crane operations and also propels the entire unit up to 7¾ M.P.H. This economical unit is especially engineered for localized on-the-job mobility. Six wheeler unit, 4-wheel drive, rubber-tired. All Lorain Self-Propelled units provide a big platform on the carrier for transporting load.

Your Lorain unit can be quickly adapted to handle any and all of these jobs:

Magnets, Clamshell, Dragline, Skips, Grabs, Slings, Grapples, Skull Crackers, Hook Blocks, Tongs, Clamps

Reg. Trade Mark

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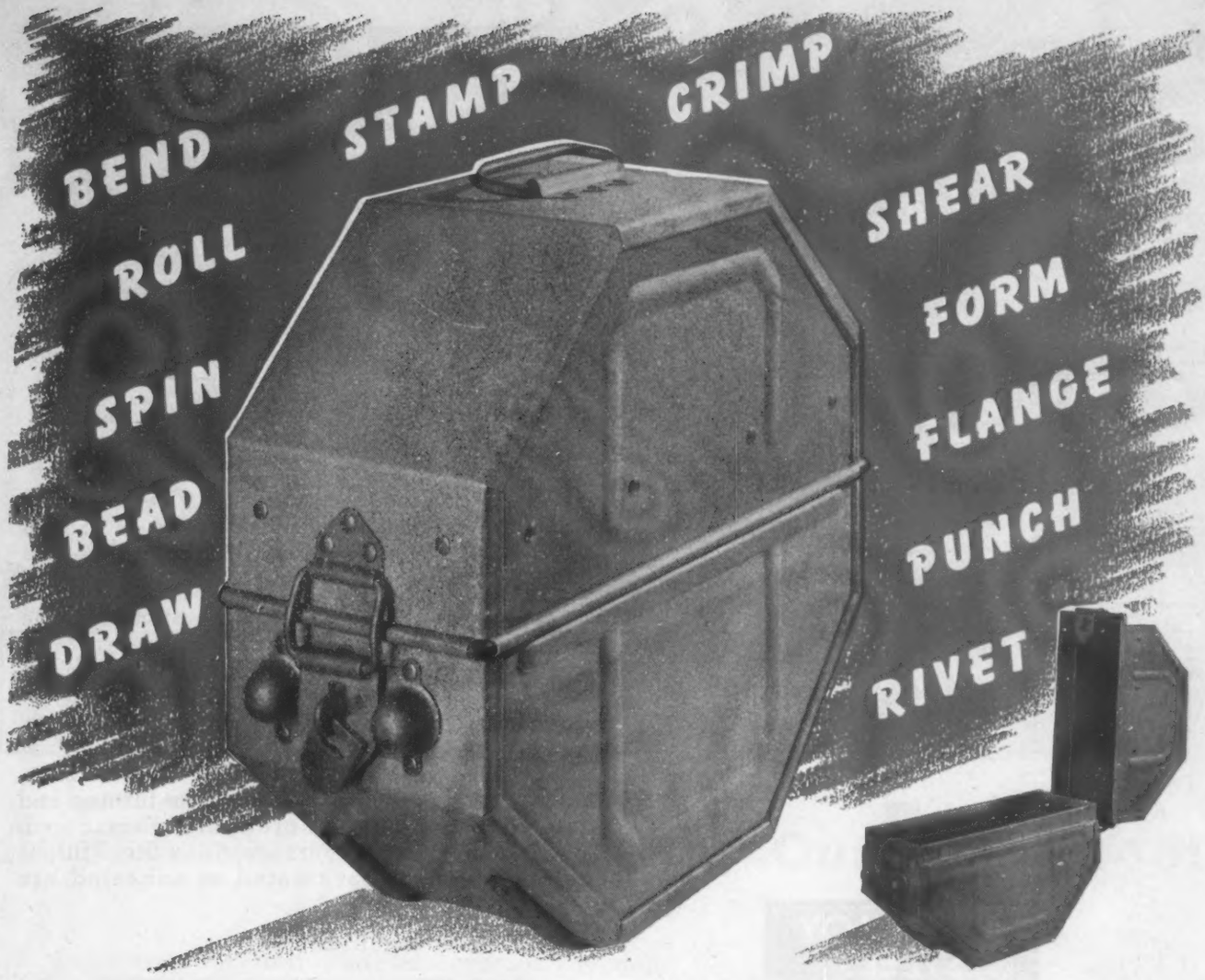
THE THEW SHOVEL COMPANY
LORAIN, OHIO

CRANES • SHOVELS • DRAGLINES • MOTO-CRANES



NO MATTER HOW YOU WORK IT, THE ZINC COATING WILL HOLD TIGHT

Here's the rule to govern your fabrication of zinc coated steel sheets when you use Republic ELECTRO PAINTLOK: *IF THE BASE METAL CAN TAKE IT, THE ZINC COATING CAN, TOO!*

These sheets have a zinc coating so tightly adherent that you can work them any way you please without cracking, peeling, flaking or powdering of the coating. The film case pictured above is a good demonstration.

And there's still more to the story. The chemically treated electro zinc plating ends that old troublesome problem of securing tight, lasting paint adherence on a zinc coated surface *without expensive preparation.*

Many manufacturers have found that Republic ELECTRO ZINC PLATED Sheets help them to improve quality and *also cut production costs.* Maybe you can enjoy the same experience. Write us.

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GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, New York

Republic Electro Zinc Plated Sheets include ELECTRO PAINTLOK in widths up to 60 inches and gauges from 12 to 24, and ELECTRO ZINCBOND in widths up to 48 inches and gauges from 25 to 37.

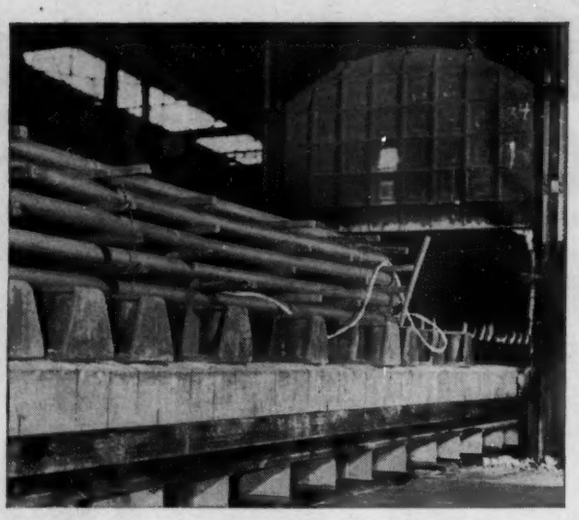
Republic

ELECTRO ZINC PLATED SHEETS

Electro Paintlok • Electro Zincbond

Other Republic Products include Carbon, Alloy and Stainless

Heat Treating and Annealing Capacity Immediately Available



ARISTOLOY
ELECTRIC FURNACE STEELS

When heat treating or annealing is an important factor in your steel specifications — turn to ARISTOLOY. Rigid metallurgical control results in top quality always.

Our heat treating and annealing operations include

heat treated or annealed

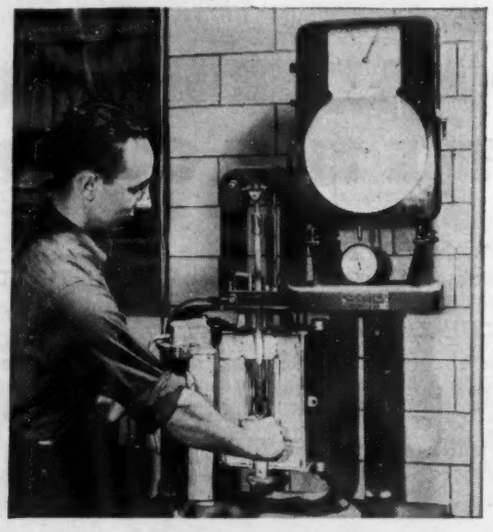
spheroidize annealing, solution and under-critical annealing, isothermal annealing and oil and water quenching.

In addition, we process steel by normalizing, straightening, cold drawing, machine turning and centerless grinding. Thoroughly deoxidized, ARISTOLOY Electric Furnace Alloy Steel Billets and Bars, either heat treated or annealed, are immediately available.

We invite your inquiries.

ARISTOLOY STEELS

Rigid Metallurgical Control For Top Quality



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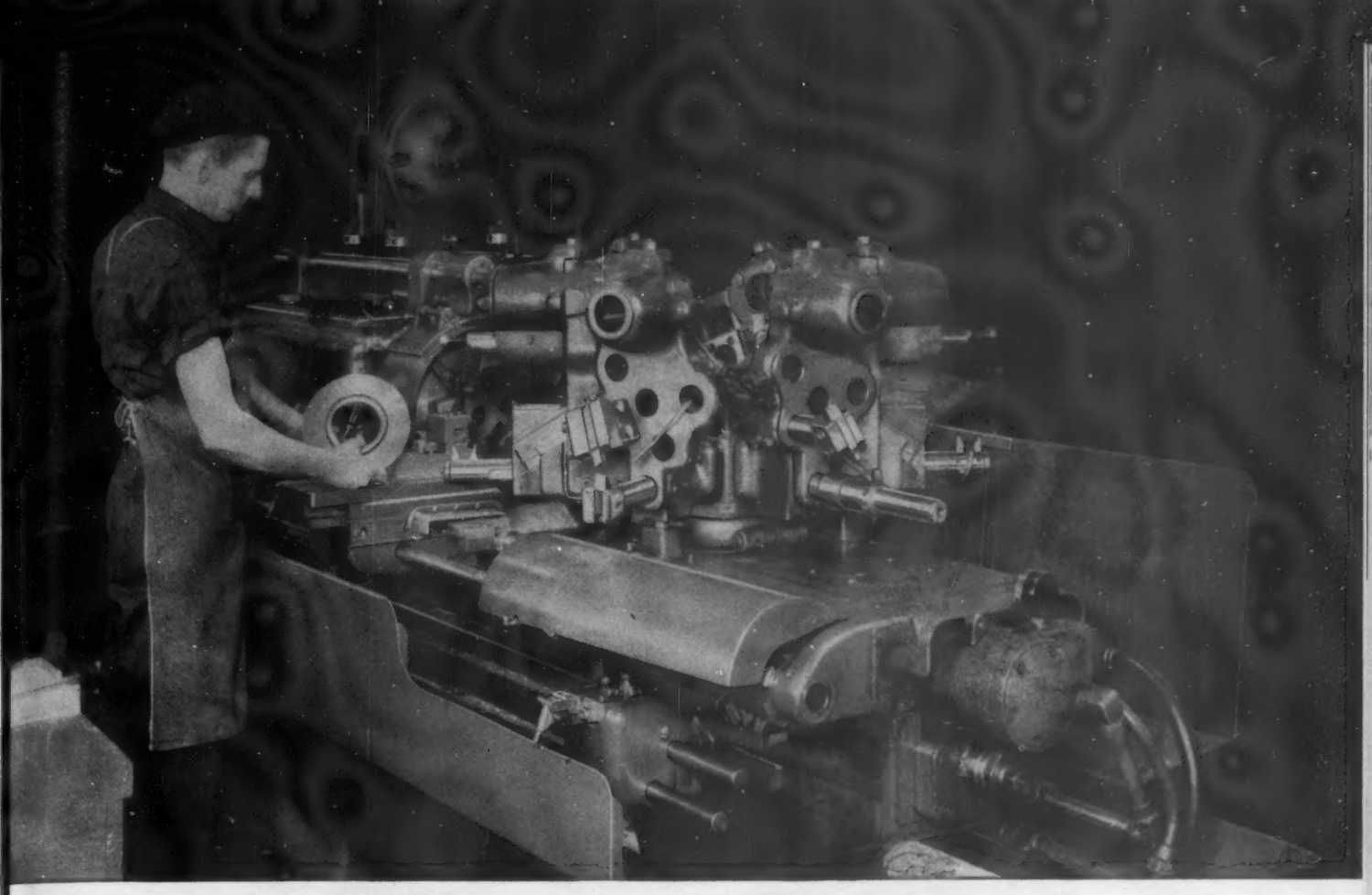
ARISTOLOY STEEL INTERNATIONAL COMPANY • EXPORT DIVISION • 815 FIFTEENTH STREET, N. W., WASHINGTON, D. C.

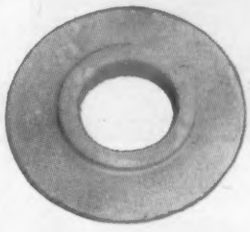


How the *FASTERMATICS* Pay Out Faster, too!

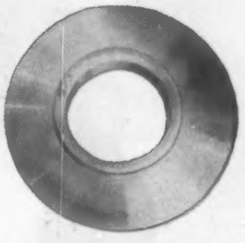
• It may seem incredible, in this day and age, for any major machine tool to "buy" itself in nine weeks' operation. Yet that's exactly what the Fastermatic did on this job of machining clutch plate hubs.

With automatic control of all machine functions, this Fastermatic reduced the former time of 15 minutes per piece, on hand-operated turret lathes, to only 3 minutes, floor to floor. Earnings piled up so fast over former production costs that the Fastermatic paid for itself in only 9 weeks, or 893 hours of operation.

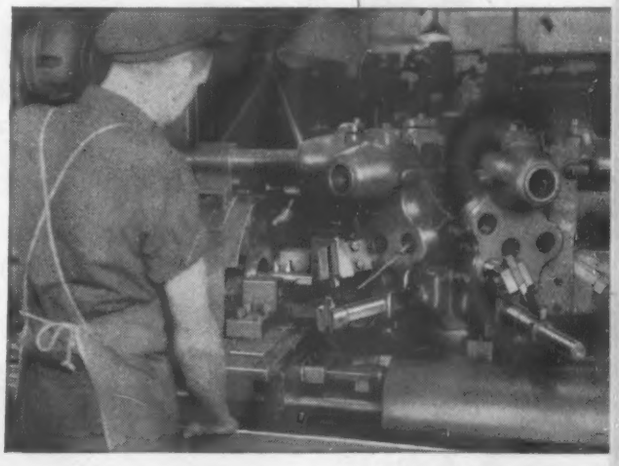
If you have work that will permit a number of cuts to be done in one chucking, investigate what the Fastermatic can accomplish to bring you faster, more efficient production and lower costs. Ask for full information.



Rough Steel Forging



Machined Clutch Plate Hub



In this tooling set-up, only three turret faces are needed to turn each part. By repeating the tooling on the remaining three faces of the hexagon turret, two parts are machined with each complete turret cycle. The operator has only to load and remove the work.

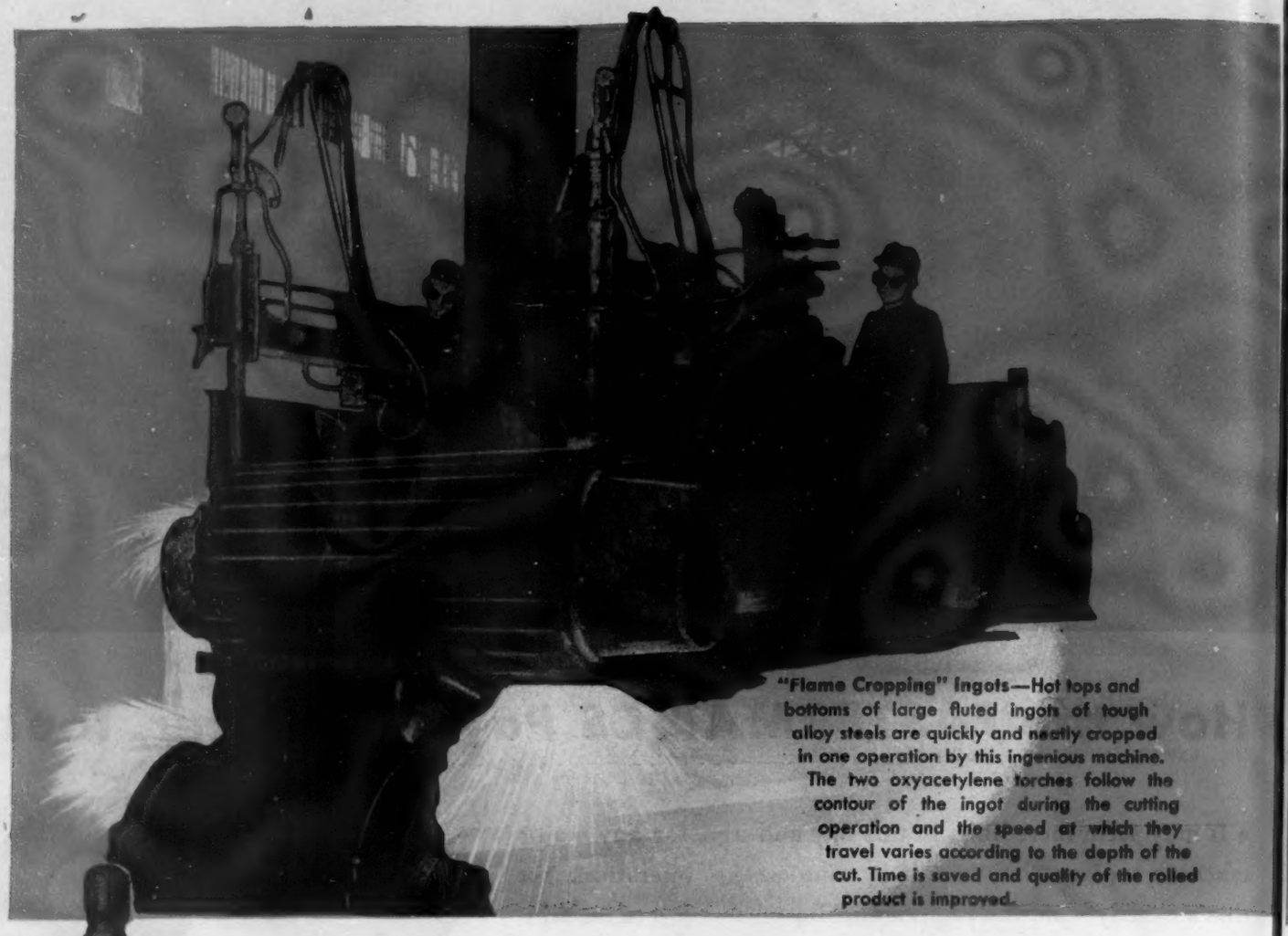
GISHOLT MACHINE COMPANY

1217 E. Washington Ave. • Madison 3, Wisconsin

Look Ahead...Keep Ahead...with Gisholt

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Airco Processes Help "Steel"



"Flame Cropping" Ingots—Hot tops and bottoms of large fluted ingots of tough alloy steels are quickly and neatly cropped in one operation by this ingenious machine. The two oxyacetylene torches follow the contour of the ingot during the cutting operation and the speed at which they travel varies according to the depth of the cut. Time is saved and quality of the rolled product is improved.

IN satisfying the 90-million-ingot-ton appetite of modern mechanized war, America's steel industry found able allies in oxyacetylene flame and electric arc methods developed by Airco. From ore ranges to shipping docks, these versatile processes helped the mills to keep over-worked equipment running smoothly, boost tonnage figures and meet the quality standards demanded by the armed forces of the United Nations.

An interesting free booklet: "Oxygen — Indispensable Servant of Industry," is available. Send for your copy.

AIR REDUCTION
60 EAST 42nd STREET
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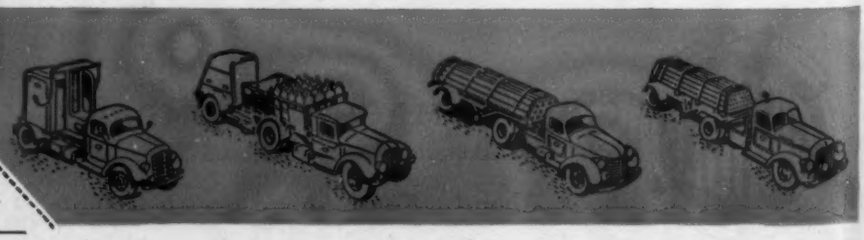
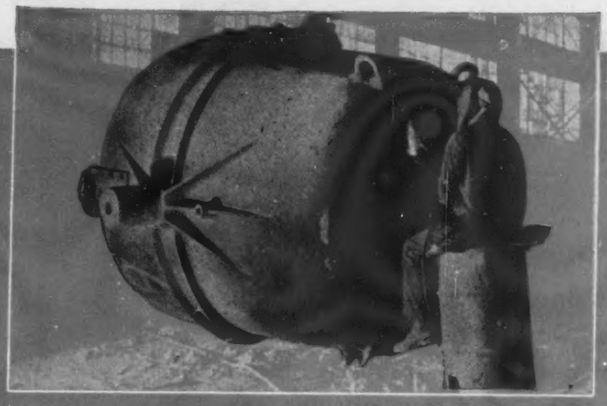
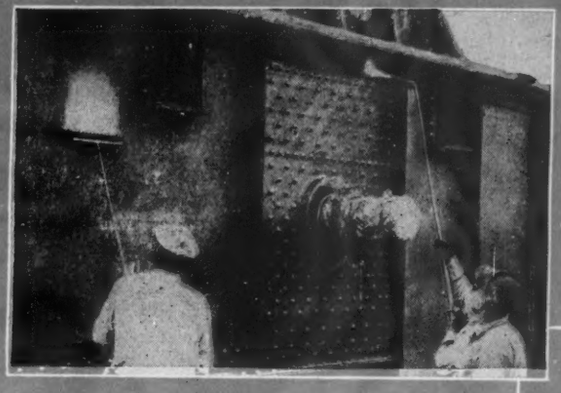


Meet Production Demands . . .



Maintenance Welding — From ladles to laboratory equipment, oxyacetylene and electric arc welding help to keep the vital tools of steel production on the job. Quick repairs by welding save time and eliminate costly shutdowns.

Welding Pipe—Welding with either the oxyacetylene torch or the electric arc, has largely replaced threaded couplings and fittings in steam, water, gas, fuel and air lines in and around mills. Construction time is reduced and the lines withstand severest kinds of service without danger of leakage.



Flame Cleaning and Dehydrating of Structurals — Using special tips, the oxyacetylene flame drives out moisture and removes dirt, grease and loose scale from new steel surfaces, providing a better base for the protective paint coat. Flame cleaning old structures with the same equipment before repainting removes old paint, loose scale and rust and drives out entrapped moisture, assuring longer life for the repaint job. For further information send for bulletins ADG 1066 and 1067.

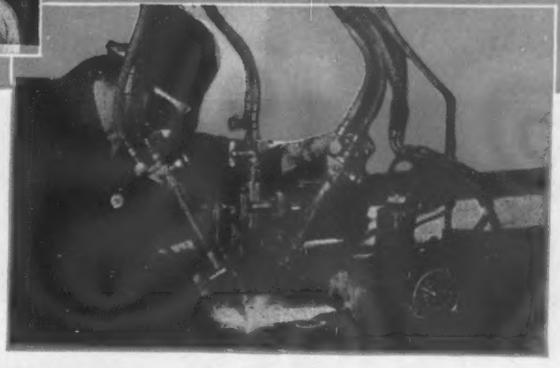


Plate Edge Preparation for Welding — Small, light-weight Airco Radiagraphs cut straight lines, circles and arcs in steel plate and prepare the edges for welding with straight butt edge, "V" groove, single or double "U" groove, single or double "J" groove or double bevel groove without land. For further information send for bulletins ADC 614 and 627.

OTHER AIRCO PROCESSES TO AID STEEL PRODUCTION

FLAME SCARFING AND DESEAMING
OXYGEN LANCING
SCRAP CUTTING
MACHINE GAS CUTTING
BRONZE WELDING
HARDFACING
CONTROLLED ATMOSPHERES

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Offices in All Principal Cities
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Your GO-AHEAD GUN

GETS ITS AMMUNITION..

The Atlas organization offers you ammunition, in the form of new tooling, to fire the starting gun signalling your return to industrial competition.

Here are hundreds of skilled technicians . . . engineers, designers, toolmakers . . . thoroughly experienced in the professions and crafts that contribute to the success of profitable manufacturing. Their work before and during the war has involved millions of dollars worth of intricate tools, dies, jigs, special automatic machinery, product design and improvement, production line layout, processing, time studies, work sheets and the finest type of perspective drawings obtainable. In addition, our machine sections include the last word in modern equipment.

These technicians can become your staff . . . our machine sections, your plant . . . for any degree of help, partially or completely.

If time is short and trouble serious, wire us now. Otherwise, let's get together for a mutually beneficial talk.

ATLAS TOOL & DESIGNING CO.
ATLAS METAL STAMPING CO.
Castor & Kensington Avenues
Philadelphia 24, Pa.

for Safety's Sake

use G-E Welding Accessories

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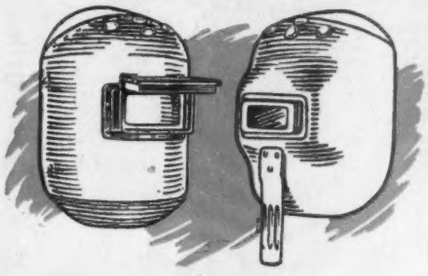
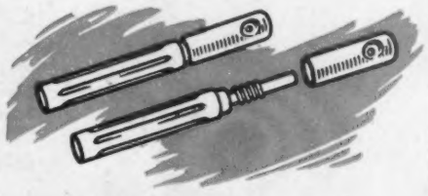
GENERAL ELECTRIC CO.



HELMETS AND HAND SHIELDS

G-E ventilated head protectors, of one-piece molded construction, some complete with flip fronts and adjustable chin rests.

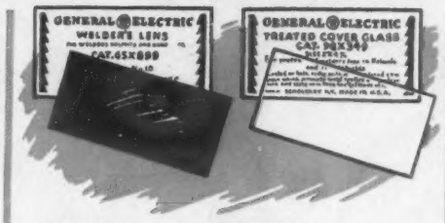


ELECTRODE HOLDERS

Complete line of the most popular types, plus the new G-E armor-clad type.

CHROME-LEATHER PROTECTIVE CLOTHING

Protection from sparks and spatter. Pliable and soft—yet thick enough to retain full flexibility under arc-welding heat. Pants, coats, overalls, sleeves, and aprons. Models to suit your "protection" needs.

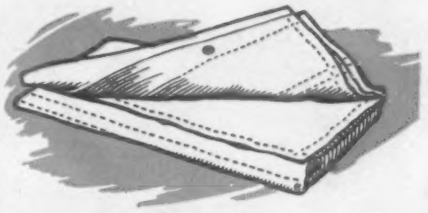


LENSES AND COVER GLASSES

Eye protection against invisible and harmful infrared and ultraviolet rays. Ground and polished on both sides to prevent distortion. G-E welders' lenses meet U.S. federal specifications.

CABLE CONNECTORS

Convenient time savers for changing cable. Insulated type has horn-fiber extending past the female half of the connection. Jackknife and bolt types for quick and positive contact. Easily insulated with hose, tubing, or tape.



FLAME-PROOFED CURTAINS

Completely screens neighboring work or workers from harmful glare, rays, and spatter. Made of high-grade duck, 8 by 10 feet—with eyelets. Special sizes available.

WELDING GLOVES AND MITTENS

These gloves and mittens, of chrome-tanned leather, are inside-sewn, gauntleted, and reinforced with a protective patch. Mittens come in one-finger and fingerless styles. Asbestos mits are lined for comfort and heat protection.

WELD-SPATTER-RESISTANT COMPOUNDS

Two new preparations (mixed-water type) that prevent the adherence of weld-spatter to the work. You apply one of these compounds to the surface to be welded. The compound resists weld-spatter and can itself be removed with a damp cloth. No surface wetting necessary before application, no smoke, no fumes, no oxidation.

STRIKE-EASY COMPOUND

Striking an arc on a cold plate is no longer difficult—with this new welding aid. It's particularly effective when welding with small-diameter electrodes at low currents.

For detailed information, contact your G-E arc welding distributor or write: General Electric Company, Schenectady 5, New York.

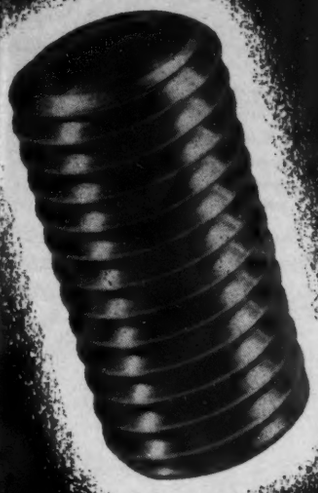
GENERAL ELECTRIC

672-70-8748

MORE PRODUCTION PER MAN HOUR

These smaller size Niagara Inclinable Presses offer the same design features of larger Niagara Models. The instant acting 14-point sleeve clutch is an important factor in increasing the output per man hour. It is possible that one or more of these presses can help you in speeding up production of urgently needed material.

NIAGARA MACHINE & TOOL WORKS, BUFFALO 11, N. Y. • **District Offices: New York, Cleveland, Detroit**



P-K puts something really NEW in SOCKET SCREWS!

New

PARKER-KALON

☆ Ground Thread

SOCKET SET SCREWS

Parker-Kalon – cooperating with Landis Tool Co. – has adapted centerless thread grinding – the process once employed only for screws used in the finest precision equipment – to quantity production of P-K Set Screws. Made from hardened stock, with the characteristic smoothness and distinctive bright appearance of a ground finish, these new screws are as different from ordinary set screws as night and day!

PARKER-KALON

New

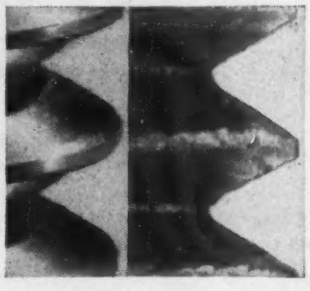
☆ Size-Marked ☆ Gear Grip

SOCKET HEAD CAP SCREWS

Another Parker-Kalon "first", the Size-Mark is an exclusive feature sure to be welcomed and appreciated by every socket screw user. The correct size of each screw can be seen at a glance. Together with the Gear Grip, which prevents slipping and fumbling, the Size-Mark gives P-K Socket Head Cap Screws a double feature that will save you hours of time and trouble.

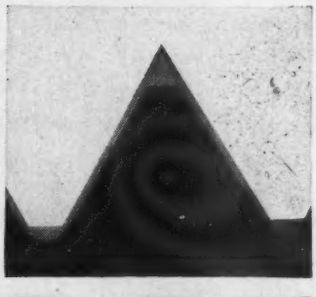
*U. S. Patent No. 126,409

SMOOTH, clean threads. Compare the gleaming ground threads (left) with tool-marred surfaces of cut threads (right).



★

FAULTLESS thread contour and lead. Ground thread smoothness and accuracy are apparent in the comparator. Dependable Class 3 Fit is assured.



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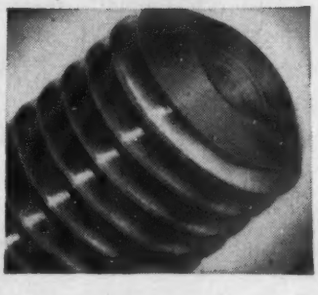
CLEAN starting thread permits P-K Ground Thread Set Screws to start easier, and speed assemblies.



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These first really NEW improvements in years offer welcome and worthwhile advantages to socket screw users... faster and better assemblies, improved security, elimination of errors, and time-saving ... in the toolroom and on the assembly line.

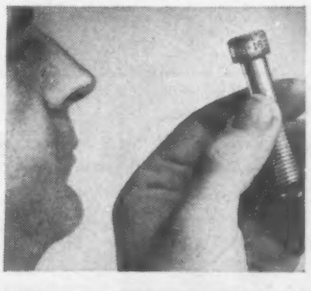
Parker-Kalon Socket Screws have always been held to the highest standards of accuracy, strength, and appearance by a Quality-Control routine unsurpassed in the industry. Now, these three new features put them years ahead in every test of utility and performance.

Limited Range of Sizes Now Available

Present facilities permit the manufacture of only a few sizes on a quantity production basis. As soon as additional equipment is put into operation, other sizes will become available.

Write Now for Samples

See them ... compare them ... and you'll agree good judgment calls for Parker-Kalon whenever good design calls for Socket Screws. Write today! Parker-Kalon Corp., 194-200 Varick St., New York 14.

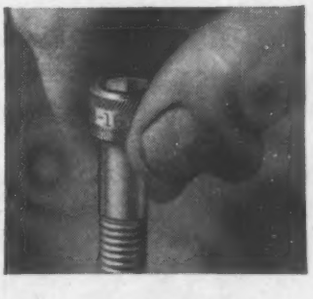


ONE GLANCE quickly tells the size. No need to "mike" or gauge it! No chance for costly errors!

★

NO WASTED time and no wasted screws when screw sizes get mixed up, if they are Size-Marked!

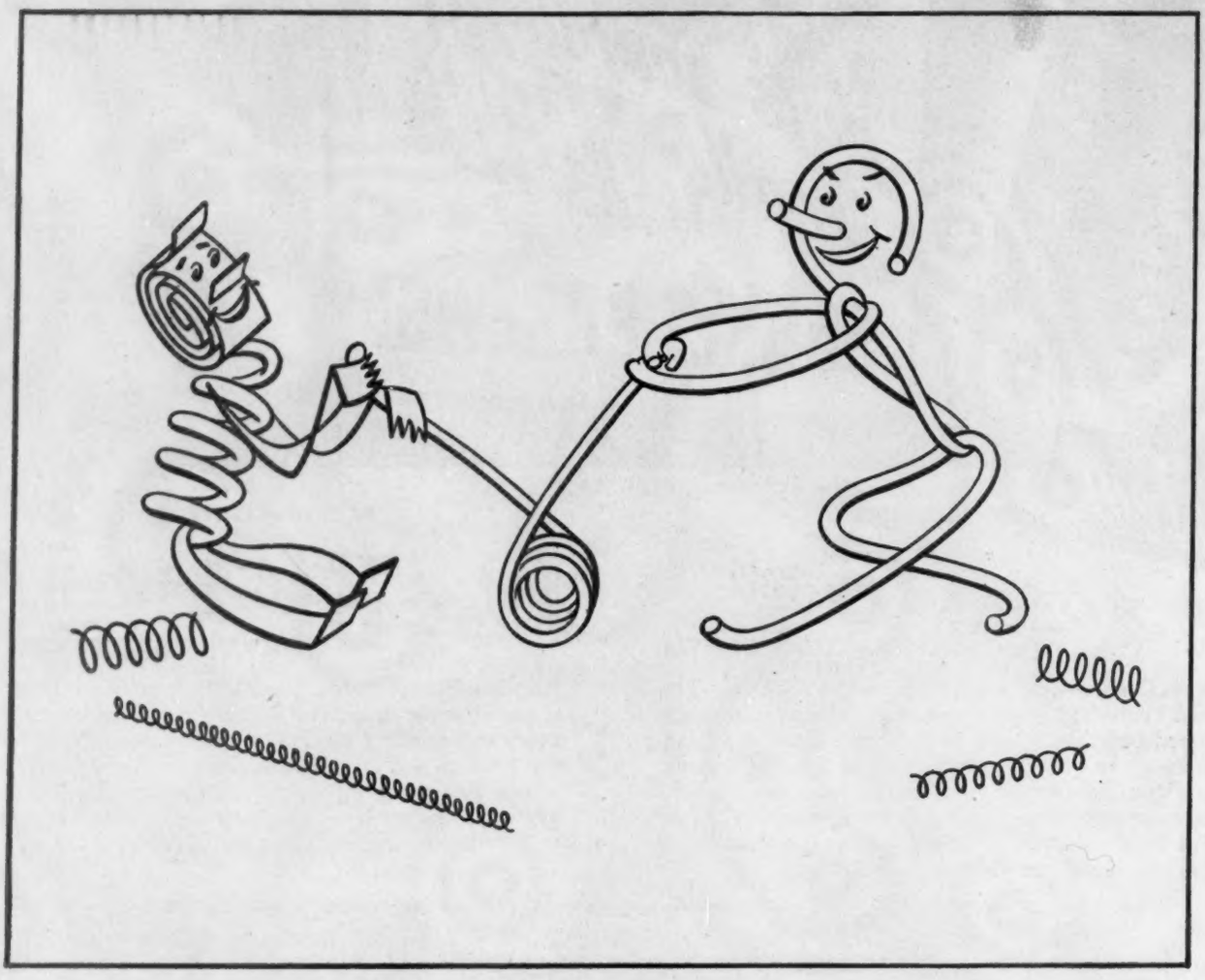
★



GEAR GRIP enables fingers to get a firm grip even when slippery with oil – makes driving surer, safer.

★

PARKER-KALON *Cold Forged* SOCKET SCREWS



SPRING MAKERS SING THE PRAISES OF WICKWIRE SPENCER MUSIC SPRING WIRE

Wickwire Spencer is widely recognized for the fine quality of its music spring wire.

How did we get the "rep?" Primarily because Wickwire Spencer music spring wire is processed to provide perfectly surfaced wire with uniformly high tensile strength, torsional value and fatigue life. It is supplied straight or with the degree of cast specified to make it easier for you to produce finer finished products.

Wickwire Spencer metallurgists will be happy to cooperate in helping solve your wire problems and in developing the type of wire that meets your particular requirements—whether you order in small quantities or in carload lots.

Our 125 year experience, plus the fact that we operate our own open hearth furnaces and modern wire mills, enables us to supply everything you need in steel specialty wires—high or low carbon; round, flat or shaped; in a wide variety of sizes, tempers, grades and finishes.

Send your wire questions to

WICKWIRE SPENCER Steel

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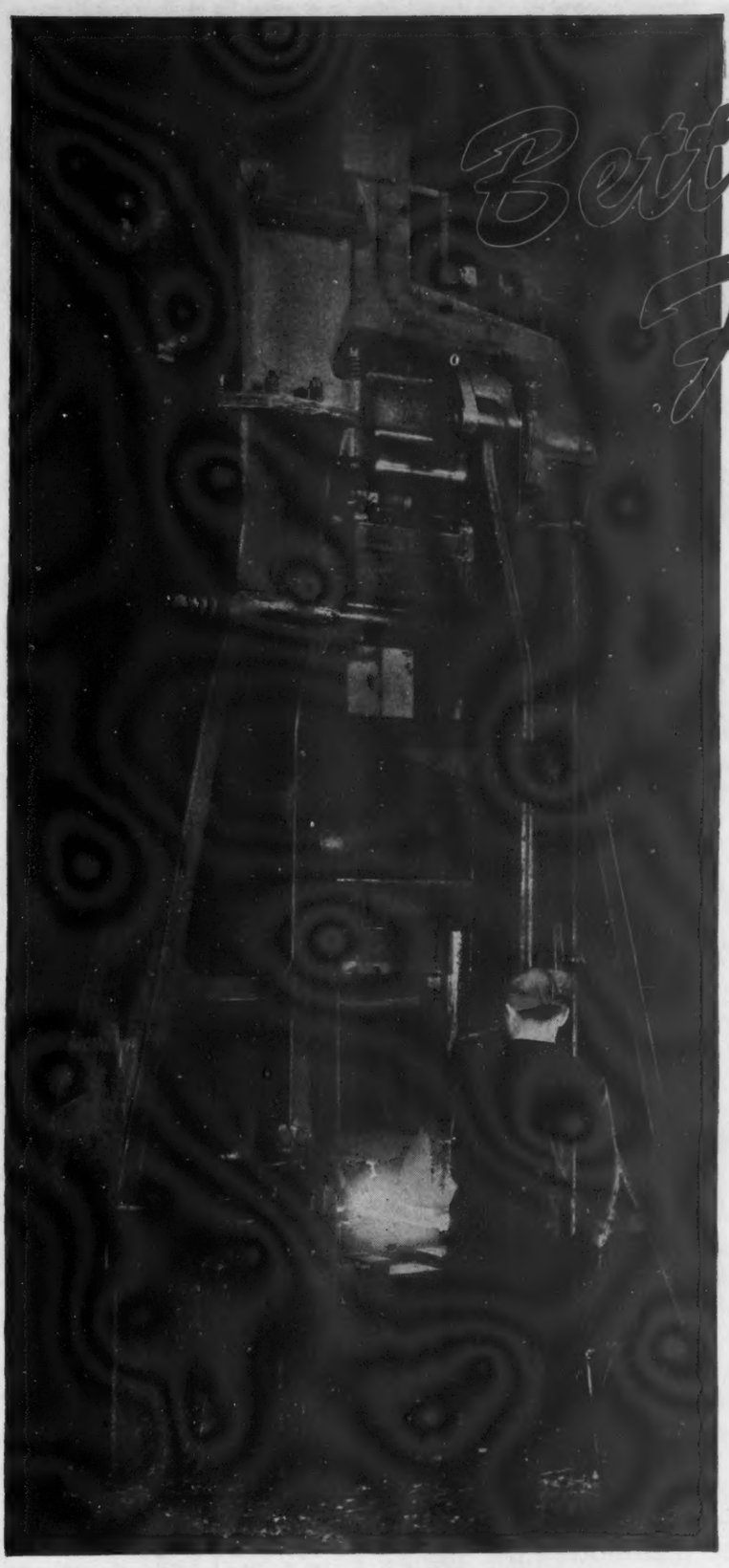
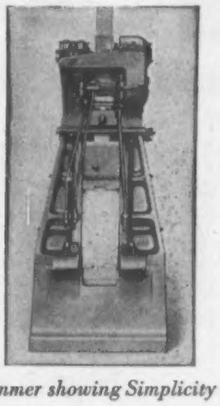


Better Drop Forgings

from Model J-2 CHAMBERSBURG Board Drop Hammer

Drop Forgings to fill the demands of today's industries must be closely matched, more easily jiggable and more true to die than those made on outmoded hammers. Competitive conditions give the advantage to parts that require less machining, that need less metal removal.

Carefully checked records of the performance of Chambersburg Board Drop Hammers indicate that the more effectively guided heavier frames, with improved facilities for maintaining alignment, result in a greater degree of precision over a longer period of time. Fewer adjustments are needed and they can be made more quickly.



Rear of Hammer showing Simplicity of Design.

Chambersburg Board Drop Hammers represent the up-to-the-minute, carefully considered essence of experience gained during nearly half-a-century of concentrated and continuous effort in the building of impact machinery.

Write for a copy of Bulletin 252-2

CHAMBERSBURG ENGINEERING CO., CHAMBERSBURG, PA.

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HAMMERS · CECOSTAMPS · PRESSES

FINISHING OVENS and SYSTEMS TO SUIT YOUR NEEDS

ENGINEERED AND INSTALLED BY DESPATCH

Experienced attention to every detail is one of the reasons why Despatch has an unbroken record of successful installations.

Whether you need a small, fast-baking Despatch Batch Type Finish Baking Oven—or a *complete* Finishing System—you can be sure of prompt, courteous, experienced service every time!

For Dependability in Finishing Equipment It's DESPATCH

Prompt delivery of latest postwar models of Despatch Finish Baking Ovens is just *one* of the important, timely services now available to you!

Despatch, with the largest engineering staff in the industry and 44 years of specialized experience in building finishing equipment, will *plan, engineer and install your complete Finishing System* from A to Z.

Take advantage of this unusual service now! It assures you of ***correct* equipment properly installed ... faster, better baking ... greater flexibility ... easier operation ... and lower finishing costs.** And you're spared weeks of needless delay and confusion.

Ask for quotations on: FINISH BAKING OVENS (all fuels; conveyor or batch models) ... DRYERS ... BONDERIZERS ... AIR CONDITIONERS ... SPRAY BOOTHS ... CONVEYORS

Visit the DESPATCH booth A-320 at the METAL SHOW

Bring Your Finish Baking Problems With You

Experienced Despatch Engineers, specially qualified to discuss your finish baking needs, will gladly talk over *your* problems at Booth A-320.

So be sure to drop in for a cordial chat, either for a long-delayed "gab-fest", or to "talk shop", or both. Our Engineers will be eager to see you.

WRITE TODAY

FOR COMPLETE INFORMATION

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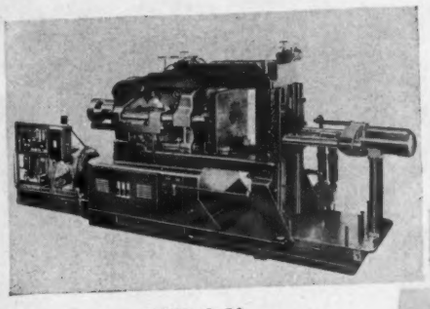
619 SE. 8 St., Minneapolis 14

DESPATCH OVEN CO.
221 N. LaSalle, Chicago 1

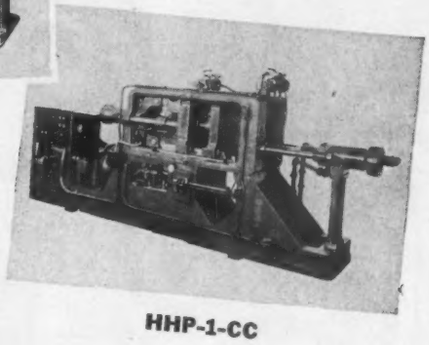
DESPATCH OVEN COMPANY MINNEAPOLIS 14 MINNESOTA, U.S.A.

DIECASTING DIGEST

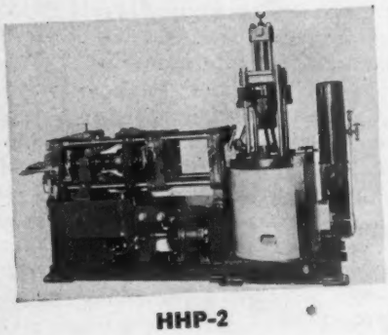
XI—Selecting the Machine to Suit the Job.



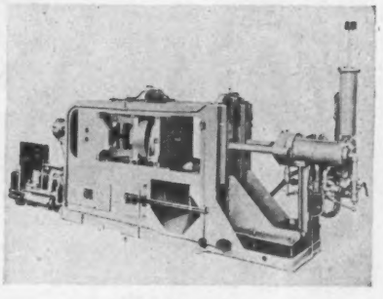
HHP-3-X



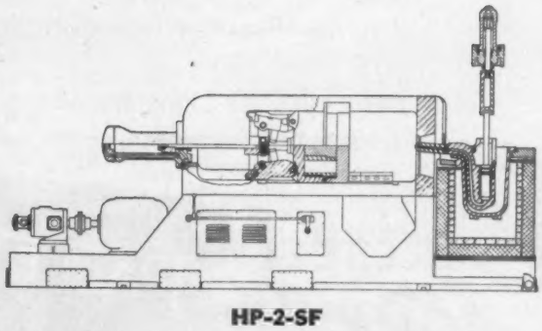
HHP-1-CC



HHP-2



HP-3½-X-SF



HP-2-SF

A very important factor in die casting is selecting equipment correctly rated for the job. To try to make castings which are too large or too heavy for the injection capacity and the die locking pressure of the machine employed, is a serious error. Such procedure can result only in imperfect castings, with high porosity and poor dimensional accuracy. The purchase of a machine too large for the production of small castings, is equally impractical, unless such castings are required in sufficient quantities to use large multiple cavity dies, advantageously.

Lester-Phoenix Die Casting Machines are made in five models in each of two types, one with submerged plunger injection for low melting point alloys such as lead, tin and zinc, the other with cold chamber "slow squeeze" injection system for aluminum, brass and magnesium, thereby providing a complete range of sizes from the HHP-2 (7.5) and HHP-1 CC for smaller zinc and aluminum castings, to the large HP-3½-X-SF, for aluminum castings up to 14 pounds, and the HP-3½-SF for zinc castings up to 19 pounds. Each one shown is a highly developed high production machine for its specific range; each is readily convertible from the one type to the other.

Except for the HHP-2 (7.5) and the HHP-2 CC, which have bar type frames, all Lester-Phoenix machines have either the well-known four piece beam type cast steel frames or the new one-piece solid cast steel frames which eliminate all joints and fitting and provide the strongest, most rugged frame possible. Die plates are adequately supported, high final "slow squeeze" injection pressure (up to 33,000 psi on aluminum) can be applied and held on the castings as they chill in the die, thereby limiting and controlling porosity, producing sound, smooth castings.

All machines have fast acting, positive closing toggle linkage for die movement; rapid die height adjustment is by a single hand crank; dies are positively and adequately supported and remain parallel, thereby producing better castings faster, at lower cost, including maintenance cost.

For complete information on these and other exclusive Lester-Phoenix features, including full data on the patented Lester Pre-Fill injection system for aluminum, brass and magnesium casting, write Lester-Phoenix, Inc., 2629 Church Avenue, Cleveland 13, Ohio.

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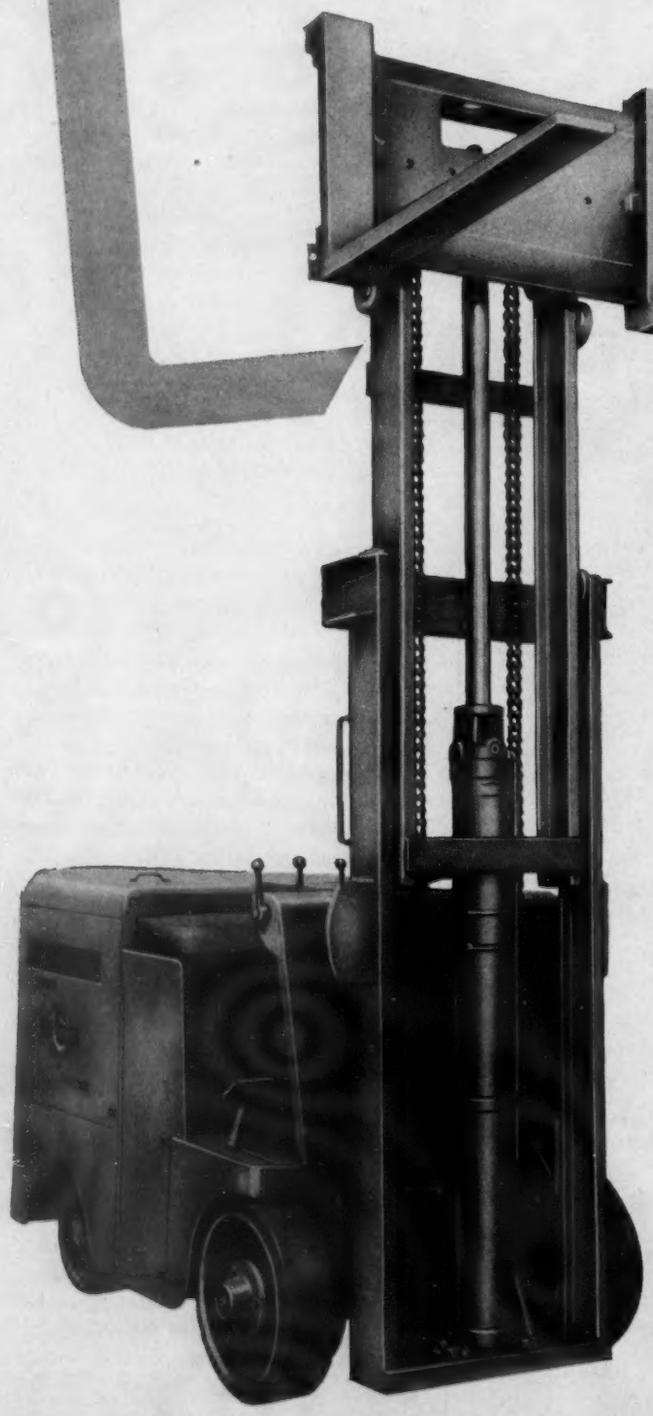
LET THE NEW PALLETIER RAISE YOUR LOADS AND Lower Your Handling Costs



WHAT is the fastest, easiest, most economical method of unloading and storing material? Time study men have found that the more you can handle in a single operation, the lower will be your cost. For *peak* handling at *top* speed, the new Crescent Electric PALLETIER is the answer.

After nearly eight years of research—with an eye on your needs—the Crescent PALLETIER is ready to lift your loads and lower your handling costs. Built for fast, safe, easy handling, it will pick-up, store and unload packaged material in a jiffy. Silent, quick, nimble as a cat, it will purr through your warehouse, slip into narrow areas, speed up inventories and reduce damage to merchandise caused by excessive handling. You'll be able to use more storage space, too. The standard PALLETIER will negotiate a 7-foot car door and can store material 108" above the floor. With forks inverted, it can store 132½" above the floor.

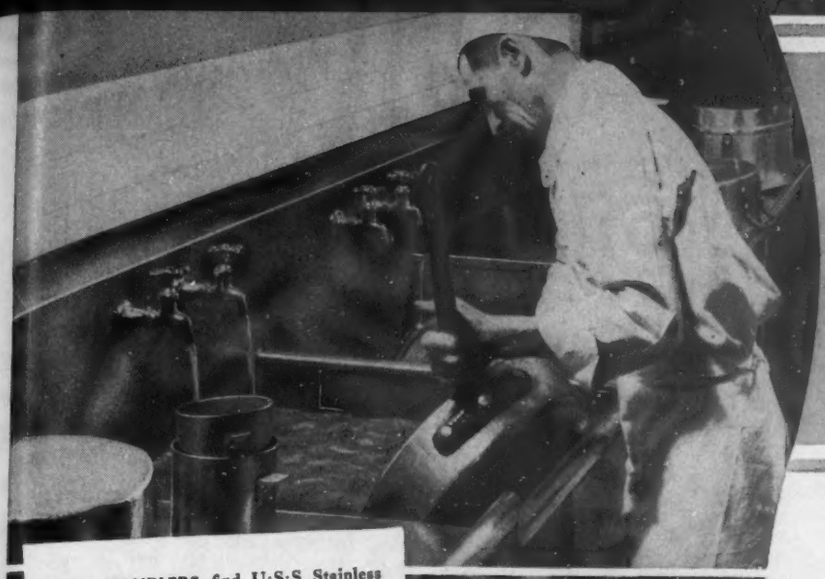
The new Crescent Electric PALLETIER has been designed for dependable and efficient service. Protection against forced acceleration is safeguarded by full magnetic controls. Foot-operated electro-mechanical brakes are mounted on each driving wheel. Emergency braking is provided by direct-acting mechanical wheel brakes from the same foot pedal or from the operator's seat. Exceptional stability in handling heavy loads is further increased by the location of the trouble-free tilting cylinder.

Easy access to all mechanisms adds to the long procession of PALLETIER advantages that make it the last word in low cost materials handling. Send for complete details and specifications today.

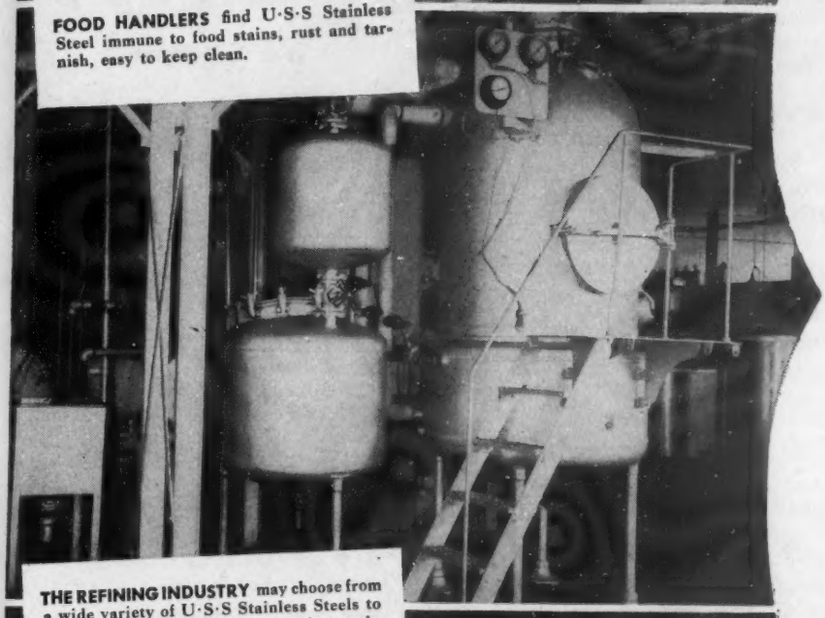
CRESCENT TRUCK CO., 1110 Willow St., Lebanon, Pa.

Industrial Truck and Tractor Specialists Since 1917

CRESCENT *Electric* **PALLETIER**



FOOD HANDLERS find U·S·S Stainless Steel immune to food stains, rust and tarnish, easy to keep clean.



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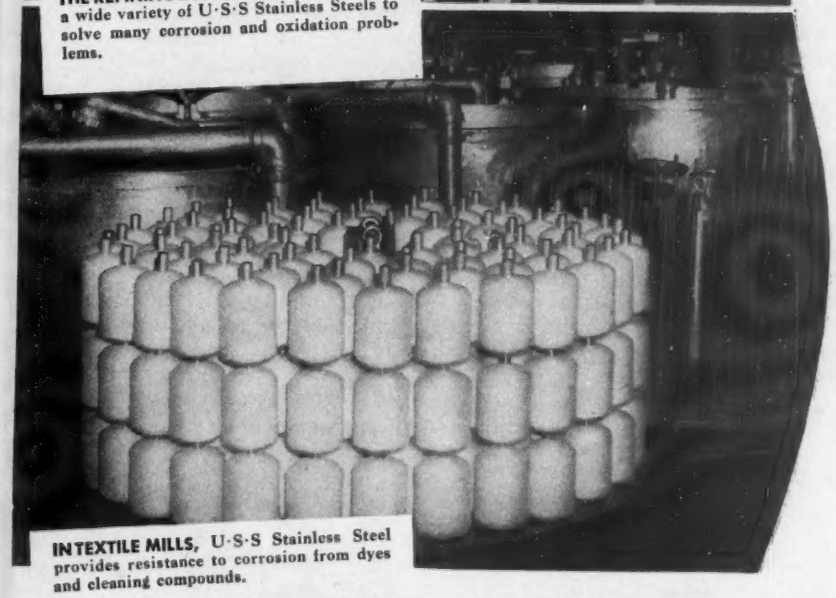

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Proposals shall be delivered no later than Monday, April 1, 1946 to the office of the President, War Assets Corporation, 811 Vermont Avenue, N.W., Washington 25, D.C.

Proposals to purchase may be predicated upon all cash or credit terms. Such terms may include a reasonable down payment, waiver of interest up to the first two years, and amortization to begin the third year, with final maturity not more than eighteen years from date of purchase.

Proposals to lease, if requiring additional expenditures by the Government, must provide for firm minimum rentals which will amortize such expenditures, with interest, over a reasonable period less than the term of the lease. Proposals to lease may include options to purchase upon reasonable terms at any time prior to two years preceding the effective date of termination of the lease.

A brochure on the plant, a detailed floor plan of the blooming and bar mill building, and a guide for use in preparation of proposals may be obtained upon request from the office of the President, War Assets Corporation, 811 Vermont Avenue, N. W., Washington 25, D. C. Arrangements for an inspection of the plant or for a conference with War Assets Corporation in connection with a prospective proposal may also be made through the office of the President of the War Assets Corporation.

All proposals will be considered by the War Assets Corporation with due regard to the applicable objectives of the Surplus Property Act of 1944 and the policies laid down in the Report to Congress of October 8, 1945 of the Surplus Property Administration on Disposal of Government Iron and Steel Plants and Facilities.

War Assets Corporation reserves the right to reject any or all proposals received for the purchase or lease of the above steel plant.

PLANT DESCRIPTION

LOCATION: 114th Street and Burley Avenue, South Chicago, Ill.

LAND: Consists of approximately 160 acres.

BUILDINGS: Plant includes 27 major and 28 minor buildings.

STORAGE YARD: (For Boat Transportation): 1929 feet long x 300 feet wide. Capacity: Iron ore 425,000 GT; Limestone 157,000 NT; Coal 273,000 NT.

COAL HANDLING EQUIPMENT: (For Rail Transportation).

COKE PLANT: 75 ovens; annual coke capacity 405,000 NT.

BY-PRODUCT PLANT: Coal Chemical Plant; Benzol Plant.

BLAST FURNACE: Annual Pig Iron Capacity 450,000 NT; 3 Stoves; 2 Turbo Blowing Engines; Pig Casting Machine; Sintering Plant, Annual Capacity 336,000 tons; Slag Utilization Facilities.

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ROLLING MILLS: 6-4 hole Soaking Pits; 2 Heating Furnaces; 1—44" Blooming Mill with annual rolling capacity of 960,000 NT of blooms; 1-36"—32" Bar Mill with annual rolling capacity of 480,000 NT of bars.

UTILITIES: Water Supply—Pumping Station located on Calumet River. Water is used for cooling, quenching and fire protection. Domestic water is secured from the City of Chicago water mains. Power is secured from the Commonwealth Edison Company. Gas is secured through natural gas line from the mains of Peoples Gas Light and Coke Company.

LABORATORY: A complete metallurgical and testing laboratory with hardness and impact testers; Magnaflux equipment, tensile testers, microscopes, cameras, darkroom equipment, photometers, shaking machine, crushers, pulverizers, carbon determinators, oxygen regulators, cutting tools and vises, scleroscope, hydraulic lift truck, burners, electrolytic etch unit and electric engravers.

TRANSPORTATION: Railroad—Plant has an elaborate system of switch tracks off the Penn. R. R. Water—Plant has its own docks, for lake shipping, on the Calumet River. Highway—City streets connect plant to arterial highways. Airport—Chicago Municipal Airport is 16 miles away.

(The above information is believed to be correct, but no guarantee is made.)

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(A SUBSIDIARY OF RECONSTRUCTION FINANCE CORPORATION)

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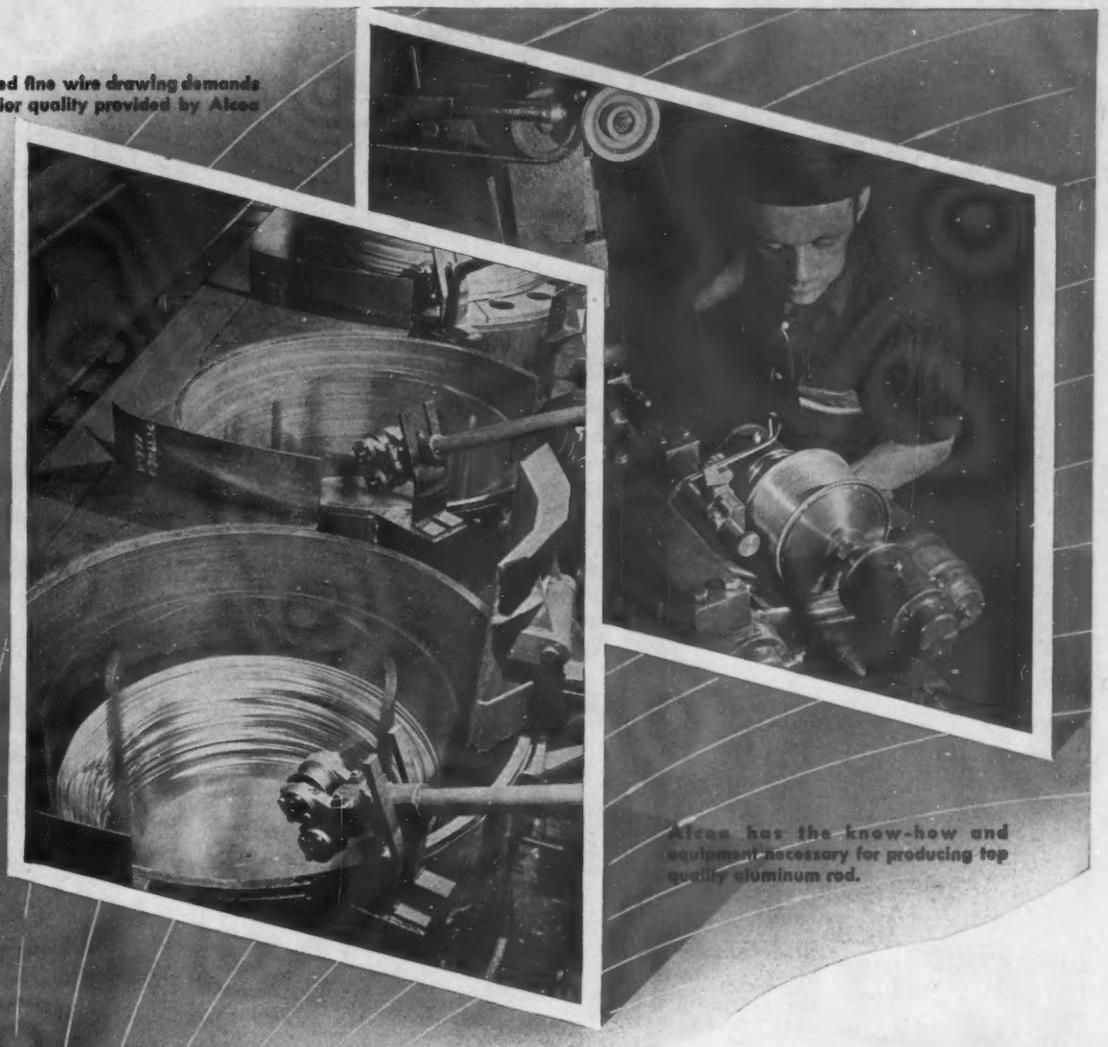

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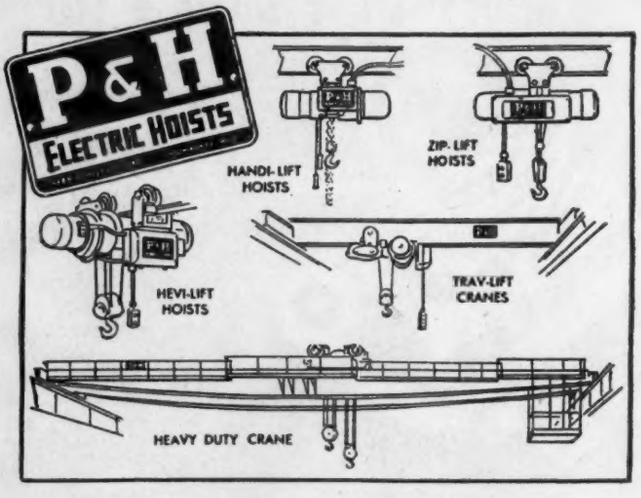

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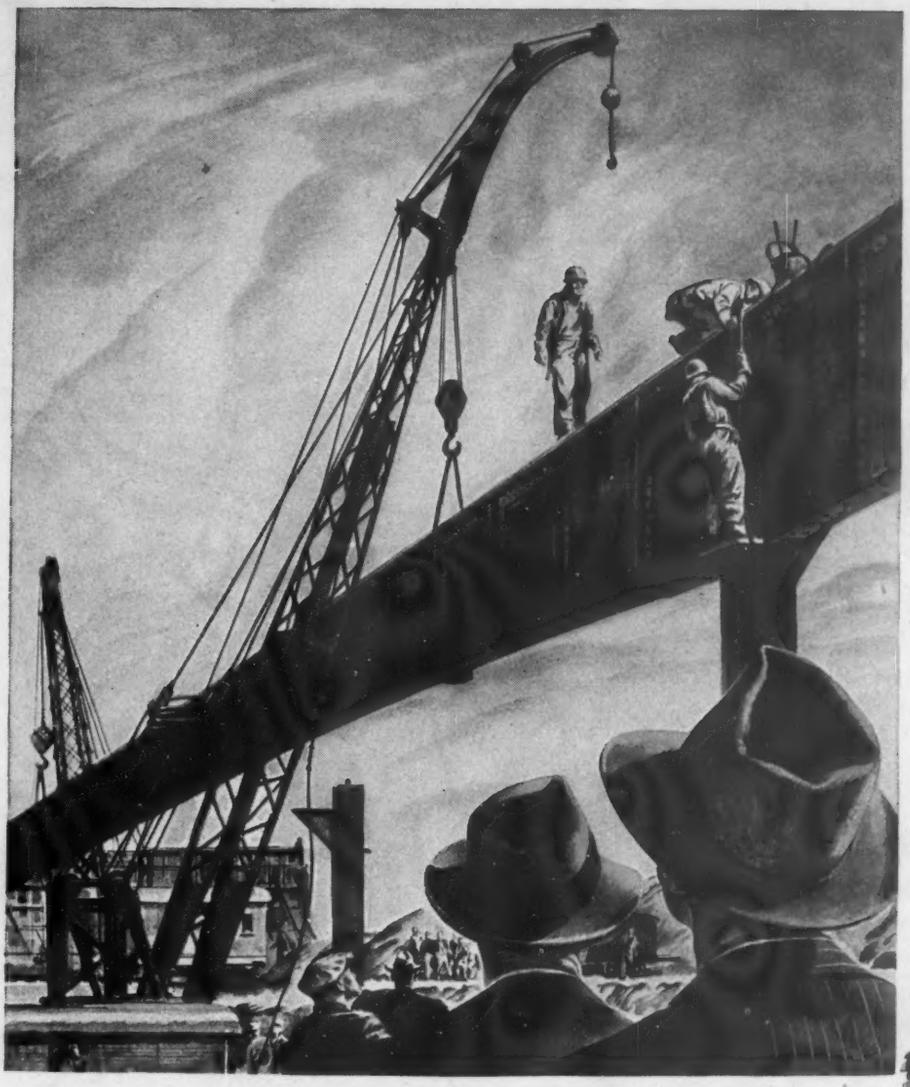
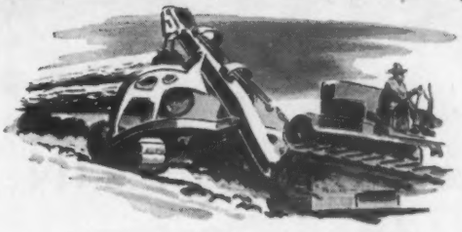


If you're a "Sidewalk Superintendent"

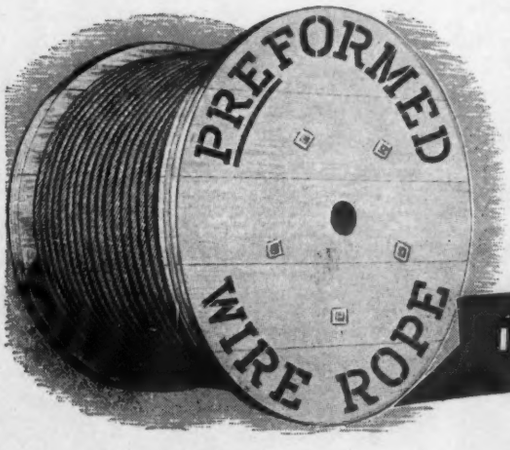
-watch the wire rope

Here's a show that scores a hit wherever it plays—building erection. These big cranes pick up steel girders and mesh them into place like the gears in your car. The star in the cab does it with levers and Preformed wire rope.



Logging machinery moves dead-weight logs with wire rope providing the sinews. Preformed wire rope gets top billing because it handles easier, resists kinking and stands the gaff.

Earth moving has come a long way since the day of the pick, shovel and wheelbarrow. Now bulldozers, shovels and trench hoes make the dirt fly—and their moving parts are actuated by wire rope, Preformed preferred.



On jobs like these and hundreds of others the new wire rope —Preformed—is breaking old performance records. Operators like it because it's safer and handles easier. The office likes it because it lasts longer and reduces time lost for replacement. It makes money by saving money.

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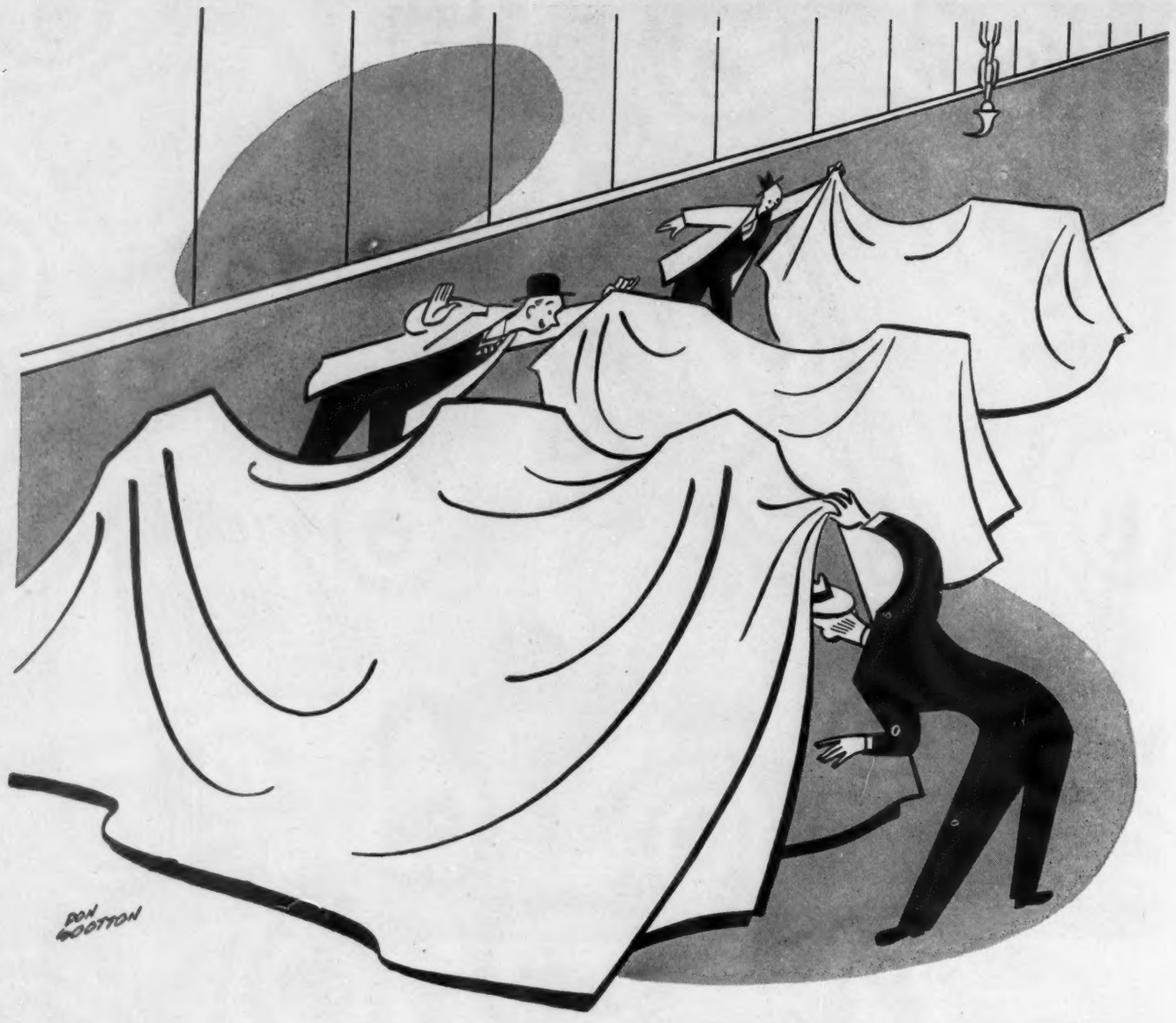

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In this space, in March, we'll disclose three amazing new turning machines which Monarch has engineered expressly to meet rising production costs. However, if you'd like a quick "preview", we'll be glad to send you photographs and brief descriptions, immediately, with full details to follow the formal introduction. Write Dept. 208.

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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 118. NO. 8 FEB. 25, 1946

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Switchgear and Controls for the Arc Furnace

Power Truck Speeds Ore Unloading

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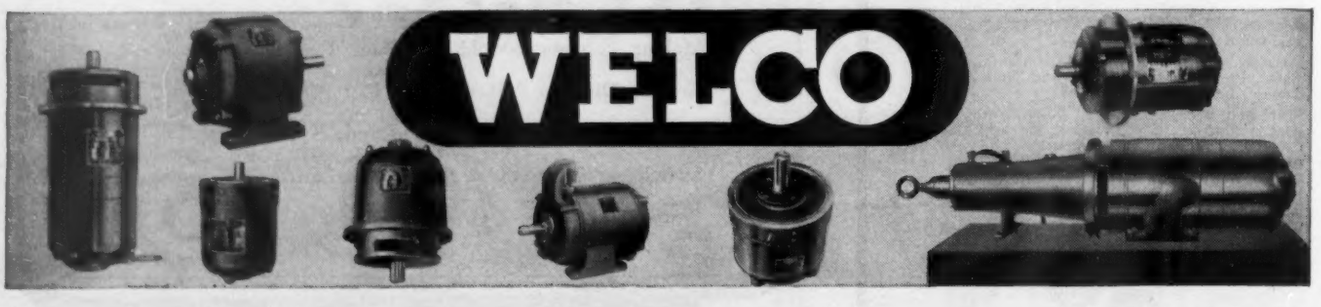


As the EDITOR VIEWS the NEWS

A Kindly Tip

Now that a truce has been patched up in labor relations in the steel industry, the natural inclination of employers and employed would be to get busy and make up for lost time as rapidly as possible. One would think, also, that government—having made such a sad spectacle of indecision and bungling in handling this situation—would be eager to help management and labor to get back to full production at the earliest possible moment. Finally, the public, seriously affected by the shutdown, certainly will applaud a quick return to maximum industrial activity.

To date, there is abundant evidence that most employers and employees are attacking work schedules with commendable zeal. In most cases, management and union spokesmen have seemed to be quite willing to let bygones be forgotten and to pitch into the new drive for production with a more co-operative spirit. There are signs that the public recognizes and highly approves this attitude.

But what about the behavior of the government? Is it matching the spirit manifested by management and labor?

We think not, because it is a regrettable fact that many persons in high places in government still do not realize the extent to which government policies were at fault in the recent fiasco and as yet are showing no inclination to admit their mistakes or to take the steps necessary to prevent their repetition in the future.

A case in point is the attitude of Mr. Bowles. He persists in denying that OPA policies are retarding production. He charges certain groups and individuals are trying to stage a revolt against price control.

Nobody questions Mr. Bowles sincerity in trying to "hold the line" against inflation. However, in denying that OPA policies retard production, Mr. Bowles either is misled by general, meaningless statistics or is deliberately shutting his eyes to demonstrable facts that are widely known throughout industry. Thousands of specific cases of production retarded or blocked by OPA rulings abound in many lines of industrial activity. These are accomplished facts which cannot be erased by emotional outbursts by Mr. Bowles against alleged pressure groups.

A kindly tip to Mr. Bowles would be to forget the National Association of Manufacturers, to forget the gallery to which he is playing, to go out to the grass roots of small manufacturing, to see with his own eyes the havoc OPA is causing and then to return to Washington and correct immediately the mistakes that are making OPA a symbol of destruction.

CONFUSION UNLIMITED: One of the results of the administration's vague price-wage-profit policy is the compounding of confusion.

Today a typical manufacturer faces this formidable situation: He orders equipment for postwar expansion. The contract submitted to him stipulates a price of say $30,000, subject to an increase up to 15 per cent "contingent upon OPA approval." He purchases steel, castings, forgings or stampings, with prices subject to increases permitted by OPA. His agreement with unions as to wages is subject to retroactive features, the cost of which cannot be determined. His income taxes back to 1940 are subject to review and revision because the Treasury Department has withheld any worthwhile rulings as to the interpretation of the important Sections 721 and 722. He also may be plagued with contract termination and renegotiation disputes that have not been settled. As if these were not enough, he is vulnerable to the sudden action of any of a half-

(OVER)

dozen bureaus which can charge arbitrarily that he has violated some obscure ruling and fine him heavily.

In short, he cannot be certain of the results of past operations and he faces a future in which he must guess wildly at what major costs and selling prices will be. Congress has a clear-cut obligation to put an end to such nonsense. —pp. 55, 57

• • •

SECRETARY OF DISCORD: The statutory functions of the Department of Commerce are to "foster, promote and develop the foreign and domestic commerce, the mining, manufacturing, shipping and fishing industries and the transportation facilities of the United States."

We wonder how much Secretary of Commerce Wallace is "fostering, promoting and developing" these interests. He caused the department to issue a report that industry could increase wages to a specific level without increasing prices. President Truman at first accepted this reasoning. On Feb. 15 he repudiated it.

When the administration's new wage-price policy was announced, one could have expected Secretary Wallace to be considering its effects upon industry. Instead he was backing a Communist party candidate in a New York election and addressing a CIO white collar union in Cleveland.

In consistently fanning the flames of discord, in unconsciously playing to the Communist party line and in habitually saying the wrong thing at the wrong time, the Secretary is not performing the statutory functions of his post. —p. 55

• • •

VERSATILE GRINDING: Developments of the past few years are tending to make the abrasive wheel more versatile as a metal cutting tool.

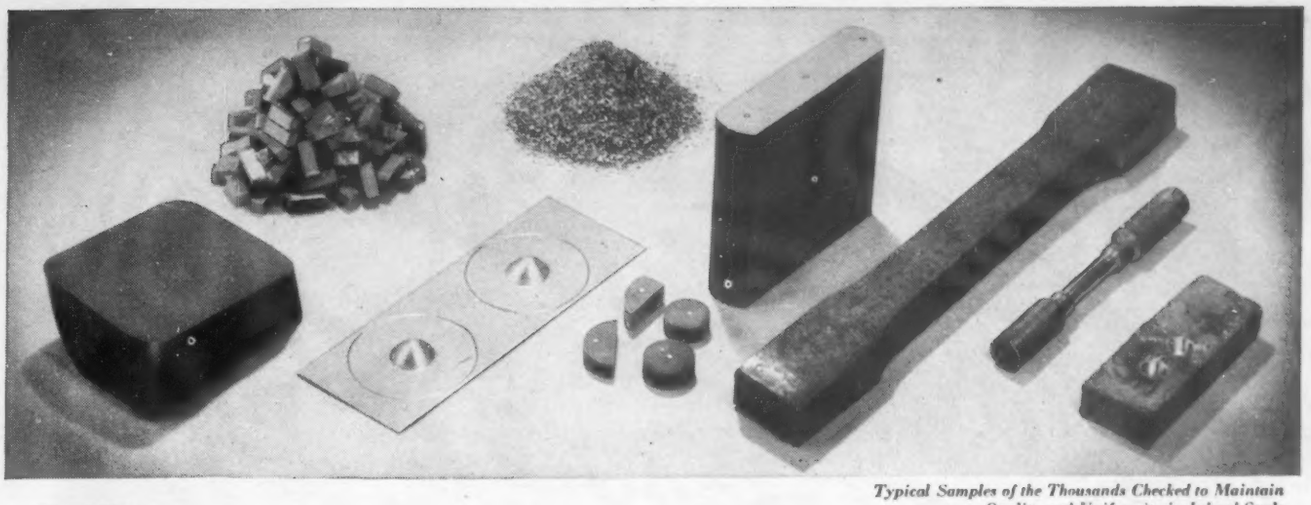
One important step in this direction is the growing practice of mounting several grinding wheels on a single wheel sleeve for the purpose of grinding separate diameters at one time. Process engineers are finding attractive possibilities in this type of combination grinding as long as they adhere to certain well-defined rules.

Wheel forming by crushing is proving to be a highly desirable means of shaping the grinding wheel face where forms are involved and where plunge cut grinding is used. Crush forming may have a distinct effect upon machine design and upon material and wheel selection. Developments in crush forming still are in a fluid state, but the process is gaining such momentum that manufacturers who use grinding wheels extensively cannot afford to overlook its possibilities. —p. 84

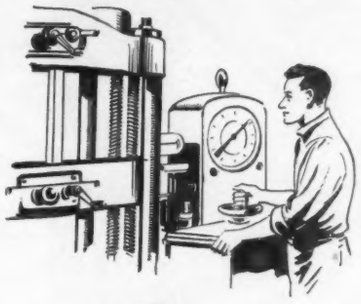
SIGNS OF THE TIMES: Japanese Committee for the Disposal of Destroyed War Weapons will melt down 30 submarines and tanks, artillery pieces, rifles and other military equipment (p. 69) to provide about 2 million tons of steel for rehabilitation work. . . . Metal Trades Manufacturing Association of Southern California warns that undue increases in wages in California may force that area out of competition with other manufacturing centers. It points out (p. 77) that the average hourly wage for common labor in California is 86 cents, compared with a national average of 71 cents. The Los Angeles-San Francisco average for molders is $1.29 per hour, against a national average of $1.19. . . . Senate Small Business Committee is drafting legislation (p. 67) to encourage "multiple tenancy" of large government-owned war plants. . . . Among the objectives of Russia's fourth five-year plan (p. 68) is to achieve production of a million automobiles and trucks a year by 1950. . . . Taking advantage of the strike-enforced lull in manufacturing operations, General Motors' standards engineers have launched an extensive program of standardization (p. 72) of power tool screw drivers, nut runners, shanks, spindles, etc. It has been found possible to eliminate hundreds of sizes and types and to standardize on a dozen or so. . . . Six manufacturers produce all of the steel wool made in the United States (p. 87), consuming about 12,500 tons of steel wire annually for the manufacture of this product. . . . Bituminous coal production was maintained at high levels during the steel strike. With consumption sharply restricted during the period, fuel stocks increased moderately (p. 142)—a point that may be significant in view of the possibility of a coal strike (p. 60) developing in April. . . . Exploration of two Canadian iron ore deposits is progressing encouragingly. One is in northern Quebec and adjacent Labrador territories (p. 75), where 300 million tons of ore is thought to be available. Development would involve construction of a 350-mile railroad. The other is a deposit in the Algoma mining area in Ontario (p. 102), from which samples analyze about 65 per cent iron. Development of this deposit would require construction of a 22-mile railroad connection with the Canadian Pacific. . . . Ford Motor Co. estimates it will be March 15 (p. 72) before assemblies can be increased to 500 cars per day. Output was 3000 daily prior to the shutdown forced by lack of steel.

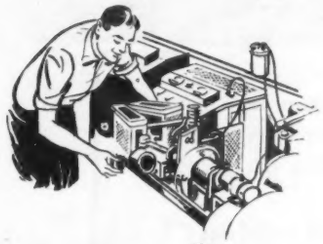
E. C. Shane

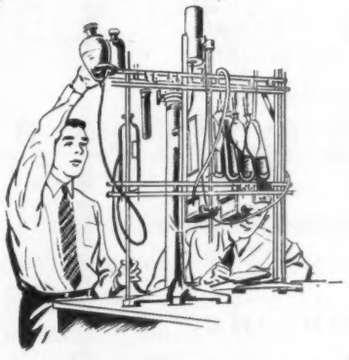
EDITOR-IN-CHIEF



Typical Samples of the Thousands Checked to Maintain Quality and Uniformity in Inland Steels







Hundreds of Tons of Samples are Tested Yearly

Making steel, the basic material of our modern world, is no simple process — nor is it one of small responsibility. For in making steel thousands of requirements must be satisfied, many involving consideration for human life as well as the reputation of designers, fabricators and builders of equipment. Operations of such consequence call for constant checks and rigid testing — ruling out all guesswork.

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RYERSON STEEL

Steelworkers celebrate the end of the four-week steel strike which cost the average steelworker slightly more than $200 in wages. Although the workers gained 3½ cents an hour over what was offered them before the walkout, nearly three years will be required to make up the loss suffered during the mill shutdown. NEA photo

Steel Price and Wage Increases Put Squeeze on Fabricating Companies

Labor and raw materials costs raised (how much is not known yet), but price relief is difficult to obtain. Distribution of average $5 increase among various finished steel products will be announced around March 1

DIFFICULT and complicated pricing problems confront the metalworking industries as the result of increased steel prices and wages granted to end the four-week steel strike. Months may be required to iron out the disruption caused in the steel consuming industries by the double barrelled increase.

Although the strike settlement is expected to work out reasonably well for the basic steel producers, who received a $5 per ton increase in return for an 18½-cent hourly wage advance, the position of those companies which use steel as their basic raw material has been jeopardized. They now are faced with the necessity of paying about 10 per cent more for their raw materials and are or soon will be confronted with demands for wage increases comparable to those granted by the basic producers. Meanwhile, their ceiling prices continue frozen, and little hope is held for early adjustment of these to compensate for the new increases in costs.

Consequently, little enthusiasm is to be found among steel consumers for the administration's new wage-price policy which generally is viewed as just another expedient to end the steel strike. Actually, production of urgently needed consumers' hard goods may be delayed for a considerable period as result of the policy, as the fabricating and processing companies are unwilling to incur heavy losses by operating under the increased costs and present price ceilings.

Meanwhile, the Office of Price Administration in co-operation with industry advisory committees is proceeding to make distribution of the overall $5 a ton steel price increase among the various products. The amount of increase to be allocated to the various products is expected to be decided and announced around March 1.

Until then, producers will not know how much they are to receive for their products and buyers will not know how much they are paying. Steel producers are billing their customers at prices prevailing before the increase was granted and will make a second billing for the amount of the increase after OPA decides on the distribution of the increase among the various products.

John C. Collet, retiring stabilization director, has directed OPA to distribute the $5 overall increase "in such manner, and in such amounts as will serve best (a) to encourage maximum production

of items in greatest demand; (b) to establish a price structure adapted to the needs of the transition and postwar periods; (c) to minimize the impact of the increase upon the prices of consumer goods; and (d) to remove or minimize hardship to the smaller and nonintegrated producers."

The increases will be effective as of Feb. 15.

Mr. Collet's directive requires that OPA announce the price adjustments of an amount equal to 90 per cent of the increase within two weeks (by Mar. 1) and to complete the remaining price adjustments within five weeks from the date of the order.

The OES director also directed OPA to review the new maximum prices on the basis of reports of not less than three months' operating experience, and, if necessary, to adjust such maximum prices to the level at which they would have been set in the light of such experiences and in accordance with the pricing standards prevailing at the time of such review.

J. M. Larkin, left, vice president, Bethlehem Steel Co., and CIO President Philip Murray, right, sign agreement for 18½-cent wage increase in Bethlehem's Washington office. Standing, left to right: D. C. Mills, manager, industrial relations, Bethlehem; K. L. Houck, Bethlehem counsel; C. A. McLain, Bethlehem counsel; Lee Pressman, CIO general counsel; David J. McDonald, secretary-treasurer of the steelworkers' union; Van A. Bittner, assistant to CIO President Murray. NEA photo

Lists Products Under Directive

In a supplementary order, Mr. Collet listed the following products to be covered by the adjustable pricing directive:

Ingots, forging billets and blooms, rerolling billets and blooms, slabs, sheet bars, tube rounds, sheet steel (blooms and billets), structural shapes (wide flange, standard), steel piling, plates (sheared, strip mill [unsheared], universal), pipe (butt weld [black and galvanized], lap weld, electric weld seamless), other pipe, tubing, conduit, couplings, wire rods (all grades and sizes), wire (manufacturers' wire, nails and staples [bright], barbed wire, woven wire fence [galvanized farm], bale ties), fence posts, black plate, tin plate (hot dip, electrolytic, short ternes), skelp.

Rails (standard, light, girder, guard and high T.), splice bars, tie plates.

Bars—hot-rolled (commercial quality, forging quality, special requirement quality), concrete bars (new billet, rerolling), hoops, bands and cotton ties, wire (all kinds other than manufacturers' wire), woven and welded fence other than galvanized farm fence, seconds, forged and/or rolled steel sheets, gear blanks, wire rope strand, cord and cable, welded or woven wire mesh for reinforcement, sheets (hot-rolled, 18 gage and heavier, hot rolled, lighter than 18 gage, long ternes, galvanized, cold-rolled, enameling sheets, electrical sheets), strip (hot-rolled, cold-rolled), track spikes, floor and miscellaneous special plates, hot-rolled bars (other than commercial, forging and special requirement quality), cold-finished bars, nails and staples—all kinds other than bright, coated sheets other than galvanized, tool steel, car and locomotive axles, woven wire cloth and wire netting but not products made thereof, alloy rolled products of all shapes detailed above.

Any adjustments in extras will fall within the average $5 a ton increase, Warren Huff, head of the OPA Metals Branch, said at a meeting of the General Steel Products Advisory Committee in New York last week. Extras, he explained, are one of the three factors which will constitute maximum prices, the other two being the base prices and freight.

A number of changes in steel extras, proposed by the advisory committee, have been in the hands of OPA since early last December and considerable speculation has been heard as to whether the extras would be treated separately or would fall within the scope of the $5 average increase.

In addition to the meeting with the general steel products committee in New York, OPA has held meetings in Washington with the following advisory groups: Cold finished bars; steel shipping containers; bolts, nuts and rivets; screws; tool steel; merchant pipe jobbers; warehouses and jobbers of secondary steel; and steel warehouses. Meetings scheduled for this week, all in Washington, include: Feb. 25, fine and specialty wire products; concrete reinforcement bars; alloy steel products; Feb. 26, steel tubular products; structural steel products; plate fabricators; Feb. 27, brass mill products; manganese steel castings; Feb. 28, malleable castings; nonferrous castings; pig iron; March 1, steel castings; March 2, can manufacturers; March 4, iron ore.

While the distribution of the increase can be worked out to the satisfaction of the large basic producers, the setting of prices that will be fair to the nonintegrated producers will be more difficult. Some of these have not resumed operations pending clarification of the prices they will have to pay for semifinished steel and prices they will receive for the products they produce. This group has pointed out repeatedly that if the increase per ton of semifinished is the same as the increase on their finished products they would be worse off than before. Some nonintegrated mill officials last week expressed the hope that the increase on semifinished might be held to about $2 a ton while that on finished items might be around $8.

After the distribution of the increase is made, OPA still will be faced with the problem of granting price relief to fabricators and other users of steel.

The bulk of the fabricating companies which hold contracts with the United Steelworkers remained closed last week and many may continue down until price relief is granted them.

Outlining the plight of the fabricators in a telegram to Reconversion Director

John W. Snyder, the Tristate Industrial Association, Pittsburgh, said only two of 56 members who have contracts with the steelworkers' union "have found it possible to agree to the basic steel contract conditions and reopen plants without waiting for price relief. Two companies have declared their intention to liquidate and others seriously considering." The association requested Mr. Snyder or some other official of the OWMR meet with the association's members in Pittsburgh to discuss the fabricators' problems.

Their position, and that of the most of the 28,000 metalworking companies, may be summarized as follows: How can a steel consuming company, which may be losing money already, pay a wage increase, pay more for its raw material (and not know how much) and at the same time not be allowed to increase the price on the product it makes and sells?

The President's new wage-price policy provides these companies may apply to OPA immediately for relief as hardship cases, but past experience does not make such applicants optimistic over early action.

OPA announced last week it will concentrate first on industry-wide price adjustments and that the pricing problems of individual hardship cases would have to wait until the industry standards were established.

One proposal which was under consideration last week was the establishment of a device whereby small firms could figure their own price relief. Under this suggestion, companies having an annual gross of less than $200,000 would, according to OPA specifications, calculate their own cost increases and figure their own ceiling price. This would be filed with the district OPA office and if the company did not hear from the price control agency within 15 days the company could begin selling under the high ceiling.

One benefit of this would be that it would eliminate a tremendous amount of work for OPA. It would also save many headaches for those small companies which lack the personnel and resources to carry their case through to a settlement with OPA.

Henry Ford II Replies to Criticism by Bowles

Replying to critical comments of Stabilization Director Chester Bowles on his attitude toward price controls, Henry Ford II said last week in a telegram to the House Banking & Currency Committee, in part: "Of course we know that price

(*Please turn to Page* 164)

Executive Order on Prices and Wages

By virtue of the authority vested in me by the Constitution and statutes of the United States and particularly by the First War Powers Act of 1941, the Second War Powers Act of 1942, as amended, and the Stabilization Act of 1942, as amended, and for the purpose of maintaining the stabilization of the economy in the present emergency, it is hereby ordered:

1. For the duration of the existing emergency, all departments and agencies of the Government shall, in any matter affecting the stabilization of the economy in which they have discretion in the use of their powers, exercise such discretion in such manner as will best promote the continued stabilization of the economy. It is the policy of the Government, in order so far as possible to prevent price increases, that there be prompt and firm enforcement, during the present emergency, of Government controls over scarce materials and facilities.

2. (a) Notwithstanding the provisions of Executive Order 9599 of August 18, 1945, as amended, and of the regulations issued thereunder, the Price Administrator shall promptly provide for the adjustment of price ceilings in any case in which he finds that an industry is in a position of hardship as a consequence of an approved increase in wages or salaries, as defined herein. An industry shall be considered to be in hardship if, after taking the entire amount of such wage or salary increase into consideration, the Administrator finds that the industry's current ceiling prices will leave it in an overall loss position or in an earnings position requiring adjustment on the basis provided in this section.

Earnings Set by Base Period

(b) The adjustment to be provided shall be such as, in the judgment of the Price Administrator, will be sufficient, for the twelve months following the adjustment, to enable the industry, unless operating at a temporary low volume, to earn an average rate of profit equal as nearly as may be to the rate of return on net worth earned by the industry in the peacetime base period applicable to that industry, and, in the case of commodities which are the subject of special statutory requirements, to a rate of return sufficient to satisfy such requirements. Except to the extent necessary to reflect the abnormal costs and reduced earnings incident to temporary operation at low volume, in no case shall the Administrator provide an adjustment insufficient in amount to prevent loss operation at the time of the adjustment.

(c) The Price Administrator shall develop standards of adjustment consistent with the purposes of this order to be applied in the case of an industry-wide action affecting an industry operating at temporary low volume.

(d) In those cases in which the price regulations provide for the establishment or adjustment of ceiling prices on an individual-firm basis the Price Administrator shall establish such standards of adjustment as in his judgment are administratively workable and consistent with the purposes of this order. He shall establish similar standards to be applied in the case of the establishment or adjustment of rent ceilings.

(e) The Stabilization Administrator shall by regulation or order establish such standards as in his judgment are administratively workable and consistent with the purposes of this order for determining the extent to which wage or salary increases in excess of the standards for approval of such increases prevailing prior to this order may be used, in the case of products or services being furnished under contract with a federal procurement agency, as a basis for increasing costs to the United States.

Wages To Conform Within Industries

3. (a) The National Wage Stabilization Board or other wage or salary stabilization agency having jurisdiction with respect to the wages or salaries involved shall approve any wage or salary increase, or part thereof, which it finds is consistent with the general pattern of wage or salary adjustments which has been established in the industry or local labor market area, between August 18, 1945, and the effective date of this order, or, where there is no such general pattern, which it finds necessary to eliminate gross inequities as between related industries, plants or job classifications, to correct substandards of living, or to correct disparities between the increase in wage or salary rates in the appropriate unit since January, 1941, and the increase in the cost of living between January, 1941, and September, 1945. The Board or other designated agency shall have authority with the approval of the Stabilization Administrator, to establish special standards for approval of wage or salary increases, differing from the foregoing general standards, to be applied in particular industries or classes

(*Please turn to Page* 165)

Steelmaking Operations Begin Slow

Integrated companies sign with union on higher wage-price basis. Nonintegrated plants await price clarification. Wage and production loss heavy during stoppage

Workers at Carnegie-Illinois South Chicago works return to their jobs as the strike ends. NEA photo

STEELMAKING operations were promptly resumed last week following settlement of the 27-day old strike of steelworkers on the basis of a wage increase and higher prices for steel products, but several weeks will elapse before production is restored to the level in effect prior to the walkout which started Jan. 21.

At that time ingot operations were reported at 70 per cent of capacity. Last week, although most of the basic steel producers had signed with the union, ingot operations averaged only around 16 per cent, a rise of about 10½ points over the preceding week.

Technical and administrative difficulties prevented full-scale operations at all plants, and in some cases such will be impossible for some time since considerable repair work on damaged facilities will be necessary. Generally, however, it is expected operations will be back to near-normal within three weeks.

End of the strike in the basic steel producing plants followed quickly upon agreement entered into between United States Steel Corp. subsidiaries and the United Steelworkers of America—CIO union Friday, Feb. 15. This called for a wage increase of 18½ cents an hour and retroactive pay increase of 9¼ cents an hour from Jan. 1 to Jan. 21. At the same time government stabilization authorities authorized an average $5 per ton price increase on carbon and alloy steel products, this increase to be applied in varying amounts on the various products.

The other integrated producers followed the lead of United States Steel though in several instances the terms of the contracts entered into with the union differed. Weirton Steel Co., Weirton, W. Va., for instance, announced a 22 cent an hour increase for hourly, piecework and tonnage employees, providing a basic minimum wage of $1 per hour. The Weirton contract, which was entered into with the Weirton Independent Union, not affiliated with CIO, in addition to the wage increase eliminated shift premium differentials. Weirton at the same time announced a 15 per cent wage increase for all salaried employees.

In the case of the Aluminum Co. of America, a general wage increase of 19 cents an hour for all employees was granted, the increase becoming effective Feb. 17.

Semi-integrated and nonintegrated steel producing plants continued down last week pending clarification of the price situation as it affects their operating position. These interests have been under a terrific squeeze between ceiling prices on their products and rising material and labor costs. Unless the price adjustment authorized by the government takes cognizance of the peculiar position of these smaller steel mills their cost situation will be even more desperate.

No complete estimate of the economic loss resulting from the strike is possible. Roughly, something like 8,000,000 tons of steel ingots will be lost to the year's production before the effect of the strike wears off. This steel tonnage represents about $325 million, which with by-products means a production loss by the mills of more than $400 million. Something over $80 million in wages were lost by the strikers in the four-week work stoppage, an average of more than $200 per worker involved. Since the workers had been offered a wage increase of 15 cents per hour prior to the strike, their walkout brought them 3½ cents more per hour but it will take them nearly three years at the higher wage scale to make up the loss of $200 in wages during the strike period. Additional millions, impossible of estimation, resulted from the shutting down of operations at fabricating and steel consuming plants.

That the strike has delayed reconversion several months is generally agreed. Steelmakers will be unable to meet delivery schedules originally set up, and consumers will have to wait much longer for steel than they had expected. Readjustment of shipping schedules will throw shipments in many cases more than a month behind original shipping dates.

Starting up the mills was not a simple matter. Primary production units had to be re-established before finished steel began to flow and restoration of high-level operations will be delayed by the necessity of repairing damaged equipment. Under ideal conditions coke ovens can produce coke in quantity one week after resumption of operations. Three to four days are required to get blast furnaces into production assuming they are not allowed to become cold. From two to three days to as much as two to three weeks are needed to get open hearths at full capacity operation. Under the best conditions electric furnaces can be restored to production within 12 hours after charging. It may require two to three weeks to get soaking pits into full operation. Rolling mills can resume operation quickly if undamaged. Slow resumption of operations at virtually all plants is necessitated by inspection and repair work plus countless preliminary administrative motions.

Benjamin F. Fairless, president, United

Climb to Pre-Strike Levels

States Steel Corp., announcing the ending of the strike said:

"We have granted a wage increase of 18½ cents an hour to our steelworkers. This amounts to an increase of about $32 per employee for each full month of work. It is the largest single wage increase in the history of the steel industry.

"In an endeavor to secure industrial peace for a year, which in our opinion is most important in the public interest, our labor contracts with the union have been extended to Feb. 15, 1947, with new provisions that there shall be no strikes, work stoppages or lockouts during the life of the extended contracts, and with further provisions designed to achieve the highest possible level of employee performance and efficiency. . . .

"A price increase of $5 a ton will not be adequate to compensate for such past heavy increases in our costs and also to take care of what we estimate will be the total cost to us of this wage increase of 18½ cents an hour to our steelworkers."

Major Pittsburgh Mills Resume Operations

PITTSBURGH

FOR THE 125,000 workers in basic steel producing plants in the Pittsburgh district the 28-day steel strike is ended and the majority of workers will be on the job by the end of this week (week ended March 2).

Some steel producers here were able to ship a limited amount of sheets and other products by the end of last week. However, full finishing operations are not likely to be attained for three weeks.

Estimated steel ingot output in the Pittsburgh area averaged about 17.5 per cent of capacity last week, compared with the 1.5 per cent weekly average throughout the strike period.

Steel Industry Recovering Slowly in Cleveland Area

CLEVELAND

PROGRESS toward normal operations in the metalproducing and metalworking industry in this district, following termination of the steel strike, has been extremely slow. Mechanical difficulties, as well as uncertainty regarding prices in the steel fabricating industry, were the principal factors retarding recovery.

Pig iron production will not attain its pre-strike level before the week ending March 9 at the earliest. By the end of last week, only four furnaces were in blast out of a total of eight in the district.

Only fifteen of Cleveland's 22 open hearths were producing steel by the weekend, and the first heat was not poured until Thursday morning. Preliminary estimate of the district's rate for the week was set at 17 per cent of capacity.

Fabricators faced many difficulties in planning their production schedules. Seven firms in Cleveland, 5 in Lorain and 15 in Akron were still strike-bound by the CIO-United Steelworkers, chiefly because they were unable to get a government price ruling on their products and, therefore were unable to negotiate with the unions on wages.

Operations Resumption at Detroit Mills Seen Slow

DETROIT

TERMINATION of the steel strike and establishment of a new wage-price policy brought little immediate relief to automotive plants or their suppliers affected by the tieup.

While work has been started on resuming production at blast furnaces, open hearths and rolling mills of Great Lakes Steel Corp., it was a slow process since all furnaces had been allowed to cool, only coke oven batteries being kept heated.

Birmingham District Steel Plants Again Producing

BIRMINGHAM

STEEL fabricators in the Birmingham district face immediate need of price relief and are dubious prompt action will be forthcoming in Washington on their behalf despite the price advance on basic steel products.

Operations in this district are being resumed satisfactorily with captive coal mines and red ore mines back at work, the cold reduction mill and the merchant mill of Tennessee Coal, Iron & Railroad Co. again in operation, and with the heat on 12 open hearths and five blast furnaces.

Damaged Plants Restrict Resumption at Buffalo

BUFFALO

THOUSANDS of the 32,000 workers covered by USA-CIO contracts in this area are still idle. Bethlehem's Lackawanna plant, which was seriously damaged by premature walkout of 11,000 workers on Jan. 11, called back about 4500. In addition, the majority of fabricators have declined to sign agreements for higher wages until assured of definite price relief.

Steelmaking Operations in East Resuming Slowly

PHILADELPHIA

ENDING of the steel strike resulted in only partial resumption of steelmaking operations in Eastern territory. While the large integrated producers signed with the union at least five smaller interests in the area up to the end of last week had not entered into new agreements. Ingot operations in the eastern Pennsylvania area for the week are estimated at 13 per cent, up 7 points from the preceding week.

Operating Difficulties Encountered at Chicago

CHICAGO

RESUMPTION of steelmaking in this district has struck several snags, consisting of one labor dispute and several equipment difficulties. As a result, the week's operating rate averaged several points lower than had been hoped for. Plants are calling workers back as rapidly as production can be stepped up.

Early days last week were spent in getting coke ovens and blast furnaces back into operation, and open hearths and other equipment repaired and warmed up. The speed at which steelmaking resumed was dependent upon hot metal supply.

By late last week in this area 22 blast furnaces were operating, as compared with 9 in the four preceding weeks.

Several steel producers report they have lost workers during the strike, mostly common laborers.

Fabricators Feeling Steel Shortage at Youngstown

YOUNGSTOWN

STEEL plants here slowly got back into operation last week, with the first iron and steel made at mid-week and full scale operations expected near the end of this week.

Meanwhile, local fabricators are running short of steel and some more layoffs are in prospect until inventories can be built up again.

Coal Presents Production Hurdle

Possibility of mine work stoppage looms on horizon. Miners' demands expected shortly. Steelmakers are seeking to build stockpiles

THE STEEL strike is out of the way, but another threat to all-out production of steel is looming on the horizon—a possible stoppage of coal production about April 1.

Present coal wage contract dated April 11, 1945, can run indefinitely. However, it contains a provision that at any time prior to April 1, 1946, in event a significant change occurs in the government's wage policy, either party shall have the right to request negotiation of general wage rates.

John L. Lewis, who heads the United Mine Workers of America, has not yet made any demands but in view of the recent change in national wage policy it is expected Mr. Lewis will make his position known shortly.

Some indication of what may be demanded by the miners' union is gleaned from resolutions at the fifteenth biennial wage scale convention of District 5 of the United Mine Workers which ended Feb. 16. These resolutions indicate the wide range of contract demands under consideration. One demanded a 35-hour, 5-day week at the same pay now received for 48 hours and 6 days. Another called for as low as a 30-hour work-week. Still another asked for a guarantee of 225 work days. Also sought was a royalty of 10 cents per ton of coal mined to be paid the union for a health and accident insurance fund, two-weeks paid vacation instead of the present $75 allowance, increasing of unemployment payments to $25 a week, and old age pensions starting at 55 years instead of 65.

Seniority Remains Important Issue

Fear of rapid mechanization of mines was reflected in a resolution that each mine unit consist of a specified number of workers, it being maintained that otherwise many workers now employed would be thrown out of work. The delegates to the convention also urged that the problem of seniority be ironed out, it being held that veterans receive credit for time in the armed services but that they should not replace workers with greater seniority. Also about 50 resolutions were offered concerning mine safety precautions. Unionization of foremen also came under the delegates' discussion.

Steel mills are making every effort to stock soft coal inventories in case of a coal strike this spring. Month-long steel strike made it possible for some interests to do this on a limited scale as indicated by photo showing barges piled high with coal at Pittsburgh

Month long steel strike permitted most steel producers to slightly augment stocks of bituminous coal, although overall inventories still are well below normal. Further improvement in stock position is in prospect, for steel operations are not likely to attain near capacity for three weeks and every effort is being made to build up coal inventories prior to April 1, as a hedge against the possibility of nationwide coal strike.

Soft coal output was well sustained throughout the steel strike period, with considerable tonnage stored in company barges, near mines and at depots along river banks, in some instances quite distant from consuming points. However, a large proportion of "captive" mines' output was shipped into commercial channels, with railroads taking substantial tonnages.

An indication as to how well bituminous coal output held up the past month is illustrated by the latest report of the Bureau of Mines showing production for the week ended Feb. 9 of 12,450,000 net tons, against 12,280,000 in like 1945 period. For the year to Feb. 9, production aggregated 70,649,000 net tons, a gain of 1 per cent over the corresponding period last year.

Soft coal inventories vary widely among steel producing plants, with one mill having under 10 days' supply while another has about 70 days' stock. In the Pittsburgh area producers had an estimated average of 15 days' supply Feb. 1 last. Present inventories are not known.

Republic Steel Reports Decline in Net Earnings

Net income of Republic Steel Corp., Cleveland, declined in 1945 to $9,543,443, compared with $10,130,296 in 1944.

Republic's 1945 sales amounted to $500,815,000, compared with $531,235,000 in 1944. Earnings in 1945 were approximately 4 per cent on investment and slightly less than 2 per cent on sales.

Provision for federal income and excess profits taxes in 1945 was $15,952,608 against $31,400,000 in 1944.

Rate of production in 1945 was 79.2 per cent, compared with 99.8 per cent in 1944.

CPA Acts To Insure Equitable Distribution of Steel Production

Deliveries must be restricted to cover immediate needs and must be made to largest possible number of customers. Small businesses, nonintegrated steel producers and warehouse stocks for general maintenance must be given urgent consideration

PROCEDURE to be followed by steel producers during the period in which the steel industry is resuming operations to insure equitable distribution of steel production was outlined last week by John D. Small, administrator, Civilian Production Administration. This procedure follows closely the distribution policies which leading producers have followed since V-J Day.

Mr. Small emphasized that "small businesses, nonintegrated steel producers and warehouse stocks for general maintenance and repair must be given urgent consideration."

He pointed out also that priority ratings outstanding prior to the strike, which were suspended on Jan. 22, would continue suspended in order to allow producers and warehouses the greatest latitude in spreading steel deliveries to the largest number of consumers until steel production again reaches high levels. This suspension will continue in operation until steel production has reached such levels that overall production will not be injuriously affected by the issuance of specific preference ratings, he said. The suspension will permit warehouses to reject or defer deliveries on any orders which in the opinion of the suppliers do not conform to the CPA policies.

Distribution Policy Outlined

Pointing out that practically every steel user will be in hardship status due to lack of steel, CPA issued the policy outlined below, to be followed by producers in the distribution of all types and shapes of steel mill products:

"1. All producers shall ration all deliveries so that no individual customer or individual class of customers will receive more steel than is needed for immediate use.

"2. All producers shall supply the minimum needs of the largest possible number of their customers, giving to each his fair, proportionate share.

"3. All producers shall schedule shipments to warehouses and distributors so that they may make deliveries of standard items in order to permit continuation of supply of production materials for small business and to continue to supply items required for maintenance and repair purposes.

"4. All producers shall schedule shipments of semifinished materials to nonintegrated producers so that these producers' operations may be maintained at an equitable rate."

Mr. Small announced also a revised statement of the policy which was put into effect for steel warehouses prior to the start of the strike, and which called upon them to establish a voluntary rationing policy. The revised policy was outlined in part as follows:

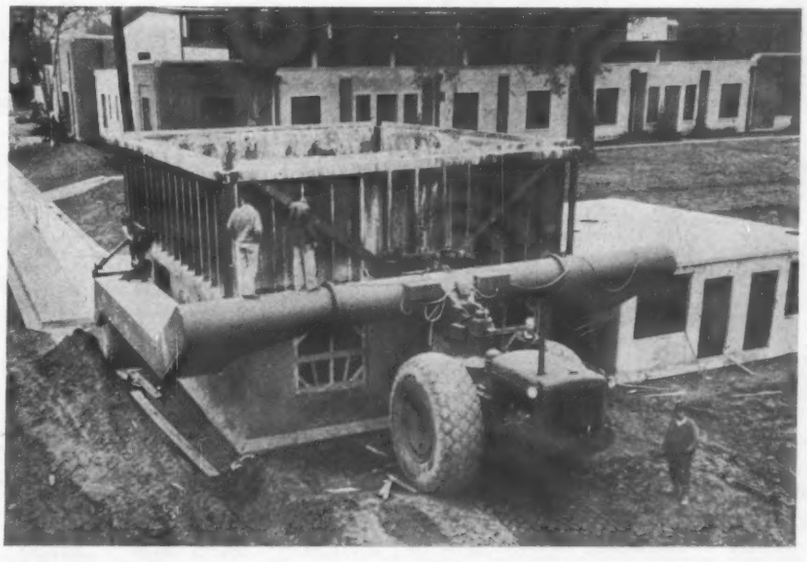
"1. For all types and shapes of steel mill products: Ration all deliveries so that no customer will receive more than is needed for immediate use and by so doing stretch stocks to last over the longest period possible for those uses for which the items you handle have customarily been sold.

"2. For types and shapes of steel mill products ordinarily used for maintenance and repair: Should your stock of these products be seriously depleted, you should make deliveries only for emergency maintenance and repair uses which have to do with public health and safety, such as requirements of hospitals, public utilities and transportation facilities, and for other extremely essential maintenance and repair. This does not include deferrable maintenance and repair nor general maintenance and repair for those industries which will be shut down for other reasons even if they should receive maintenance and repair materials."

It was pointed out that it is impossible for warehouses to supply materials in mill quantities to customers. Emphasis must be placed on using such stocks for the purpose of taking care of essential maintenance and repair requirements, and in spreading the supply equitably among regular warehouse buyers.

CPA will authorize no directions or AAA ratings other than those warranted by extreme emergencies.

Mr. Small re-emphasized that the CPA would act if necessary to meet any special situation where the national economy was in jeopardy, because of a lack of steel. He cited the recent issuance of direction 9 to the steel order M-21 and to the container order M-81 which directed the maximum utilization of the tin mill products for the preservation of perishable and seasonal foods, drugs, medicinals and biologicals.



HOUSE-LAYING MACHINE: This gigantic machine is the "Tournalayer" and is claimed to be capable of pouring a low-cost concrete house in 24 hours. Riding on huge pneumatic tires, the machine backs over the building site, drops its portable form, and begins to pour concrete. When completed, the form is hoisted and the machine rolls away. Designed by R. G. LeTourneau, Peoria, Ill., the machine will be manufactured at a Longview, Tex., plant bought from the government. NEA photo

Decline of Steel Shipments in 1945 Reflects Letdown Following War

Movement of products from mills into consumption totaled 62,246,468 net tons in year compared with 69,590,691 in 1944. Drop fairly well spread among various items but was especially marked in plates

INDICATIVE of the letdown in steel production since the end of the war total steel and iron products made for sale and shipped in 1945 were 62,246,468 net tons, compared with 69,590,691 tons in 1944, according to figures by the American Iron & Steel Institute, New York, issued last week.

Decline was fairly well spread among the various products but were especially marked in plates, reflecting greatly lessened demand for shipbuilding. As a partial offset to the numerous losses there were gains in sheets, strip, tin plate and reinforcing bars, a result of the transition from war to peace.

Hot-rolled sheets shipped in 1945 totaled 6,782,952 net tons, compared with 6,413,344 tons in 1946; cold-rolled sheets 2,891,180 tons, against 2,031,477 tons; galvanized sheets 1,707,292 tons compared with 1,378,077 tons; new billet reinforcing bars totaled 752,710 tons in 1945 against 573,998 tons in 1944 and rerolled reinforcing bars 85,006 tons against 79,524 tons.

While cold-rolled strip increased from 1,191,365 tons to 1,275,670 tons, hot-rolled strip declined from 1,703,148 tons to 1,643,111 tons. Hot-dipped tin plate increased from 2,000,317 tons to 2,060,778 tons and electrolytic plate from 604,968 tons to 861,634 tons.

Heavy structural shapes dropped from 3,835,601 tons in 1944 to 3,548,703 tons in 1945; plates from 12,866,213 tons to 7,062,329 tons; standard rails from 2,290,779 tons to 2,224,148 tons; hot-rolled carbon bars from 7,121,278 tons to 6,603,149 tons; cold-finished carbon bars from 1,775,046 tons to 1,614,136 tons; drawn wire from 2,178,345 tons to 2,059,214 tons; tool steel bars from 141,684 tons to 122,149 tons.

December shipments totaled 4,729,561 tons, compared with 4,779,628 tons in November, some products showing an increase and some a decrease, none being of importance. Details of production and shipments in December are shown in the accompanying tabulation.

Inventory Compiled of Surplus Consumer Goods

War Assets Corp. reported recently that the nation's inventory of surplus consumer goods as of Dec. 31, 1945, totaled $1161 million, based on reports from the 11 regional offices. Of this amount, $692 million worth of consumer goods is confirmed inventory while $469 million is material in transit.

AMERICAN IRON AND STEEL INSTITUTE
CAPACITY, PRODUCTION AND SHIPMENTS

Period DECEMBER - 1945

Steel Products	Number of companies	Items	Maximum Annual Potential Capacity Net Tons	Current Month: Production Net Tons	Current Month: Production Per cent of capacity	Current Month: Shipments (Net Tons) Total	Current Month: Shipments (Net Tons) To members of the industry for conversion into further finished products	To Date This Year: Production Net Tons	To Date This Year: Production Per cent of capacity	To Date This Year: Shipments (Net Tons) Total	To Date This Year: Shipments (Net Tons) To members of the industry for conversion into further finished products
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc.	52	1	xxxx	xxxx	xxx	364,509	163,708	xxxx	xxx	6,874,314	2,149,626
Structural shapes (heavy)	11	2	9,580,550	327,326	42.4	331,121	xxxx	3,549,267	39.3	3,548,703	xxxx
Steel piling	4	3		17,053		20,789	xxxx	217,079		217,336	xxxx
Plates (sheared and universal)	27	4	17,841,320	432,356	28.6	431,124	43,860	7,202,585	40.4	7,062,329	554,199
Skelp	6	5	xxxx	xxxx	xxx	62,305	21,374	xxxx	xxx	744,545	365,560
Rails—Standard (over 60 lbs.)	4	6	3,669,000	187,978	60.4	190,515	xxxx	2,252,797	61.4	2,224,148	xxxx
—All other	5	7	512,000	11,407	26.3	13,657	xxxx	164,468	32.1	170,055	xxxx
Splice bars and tie plates	12	8	1,745,960	52,334	35.4	57,373	xxxx	751,645	43.1	779,057	xxxx
Track spikes	10	9	349,400	13,898	46.9	15,757	xxxx	158,586	45.4	165,038	xxxx
Hot Rolled Bars—Carbon	39	10	xxxx	608,875	xxx	514,756	79,461	8,251,356	xxx	6,603,149	1,022,743
—Reinforcing—New billet	13	11	xxxx	81,414	xxx	84,693	xxxx	737,209	xxx	752,710	xxxx
—Rerolled	14	12	xxxx	4,804	xxx	6,204	xxxx	76,877	xxx	85,006	xxxx
—Alloy	25	13	xxxx	165,841	xxx	144,544	10,254	2,640,084	xxx	1,965,904	219,798
—TOTAL	46	14	22,381,700	860,934	45.4	750,197	89,715	11,705,526	52.3	9,406,769	1,242,541
Cold Finished Bars—Carbon	24	15	xxxx	113,421	xxx	108,752	xxxx	1,634,126	xxx	1,614,136	xxxx
—Alloy	25	16	xxxx	18,960	xxx	15,838	xxxx	366,662	xxx	326,173	xxxx
—TOTAL	32	17	3,015,910	132,381	51.8	124,590	xxxx	2,000,788	66.3	1,940,309	xxxx
Tool steel bars	17	18	273,010	7,744	33.5	7,893	xxxx	122,153	44.7	122,149	xxxx
Pipe & Tubes—Butt weld	16	19	2,232,520	125,449	66.3	130,991	xxxx	1,541,532	69.0	1,525,350	xxxx
—Lap weld	9	20	830,200	28,084	39.9	30,113	xxxx	490,579	59.1	503,951	xxxx
—Electric weld	11	21	1,570,900	57,485	43.2	50,378	xxxx	970,369	61.8	857,478	xxxx
—Seamless	16	22	3,377,700	187,943	65.6	149,344	xxxx	2,804,961	83.0	2,235,294	xxxx
—Conduit (cap. & prod. incl. above)	7	23	xxxx	xxxx	xxx	7,762	xxxx	xxxx	xxx	88,112	xxxx
—Mech. tubing (cap. & prod. incl. above)	12	24	xxxx	xxxx	xxx	48,249	xxxx	xxxx	xxx	669,130	xxxx
Wire rods	27	25	7,266,670	355,708	57.7	108,155	33,156	4,485,380	61.7	1,306,603	444,210
Wire—Drawn	41	26	5,664,690	275,221	57.3	163,195	9,282	3,481,224	61.5	2,059,214	117,046
—Nails and staples	19	27	1,253,360	48,570	45.7	49,720	xxxx	597,725	47.7	602,558	xxxx
—Barbed and twisted	15	28	539,610	18,267	39.9	18,366	xxxx	234,126	43.4	234,209	xxxx
—Woven wire fence	16	29	1,113,860	33,863	35.9	34,167	xxxx	375,467	33.7	373,920	xxxx
—Bale ties	12	30	149,700	6,565	51.7	6,749	xxxx	74,957	50.1	82,609	xxxx
Black Plate—Ordinary	9	31	xxxx	xxxx	xxx	83,491	2	xxxx	xxx	633,439	4,805
—Chemically treated	8	32	465,000	14,216	36.1	12,323	xxxx	128,134	27.6	114,949	xxxx
Tin and Terne Plate—Hot dipped	10	33	3,795,850	134,949	42.0	145,836	xxxx	1,968,894	51.9	2,060,778	xxxx
—Electrolytic	10	34	2,231,850	59,729	31.6	63,730	xxxx	867,445	38.9	861,634	xxxx
Sheets—Hot rolled	30	35	19,197,320	1,172,645	72.1	544,831	46,156	13,801,751	71.9	6,782,952	483,078
—Cold rolled	12	36	7,131,460	452,219	74.8	302,115	xxxx	4,758,045	66.7	2,891,180	xxxx
—Galvanized	16	37	2,915,130	122,230	49.5	130,471	xxxx	1,690,885	58.0	1,707,292	xxxx
Strip—Hot rolled	24	38	7,055,390	200,388	33.5	135,994	24,806	2,622,886	37.2	1,643,111	279,048
—Cold rolled	35	39	3,119,850	105,767	40.0	104,429	xxxx	1,349,272	43.2	1,275,670	xxxx
Wheels (car, rolled steel)	5	40	319,400	23,704	87.5	24,972	xxxx	291,106	91.1	292,637	xxxx
Axles	6	41	408,170	10,283	29.7	11,002	xxxx	143,185	35.1	147,927	xxxx
All other	5	42	190,490	3,329	21.9	3,348	xxxx	45,038	23.6	41,719	xxxx
TOTAL STEEL PRODUCTS	152	43	xxxx	xxxx	xxx	4,729,561	432,059	xxxx	xxx	62,246,468	5,640,113
Effective steel finishing capacity	152	44	67,310,000	xxxx	xxx	xxxx	xxxx	xxxx	xxx	xxxx	xxxx
Percent of shipments to effective finishing capacity	152	45	xxxx	xxxx	xxx	75.3%	xxxx	xxxx	xxx	84.1%	xxxx

ICC Freight Rate Proposal Fought in Court

Nine states and 33 railroads seek to enjoin ICC from raising rates in North, lowering them in South and West

THIRTY-THREE western railroads have joined nine northern states in seeking a permanent injunction restraining the Interstate Commerce Commission from increasing railroad freight class rates in the North and decreasing them in the South and West. Hearings on the plea opened before a special three-judge federal court in New York last week.

The states contend that the boost of 10 per cent in the North, with a corresponding decrease in the South and West, would place them at a disadvantage, while the railroads hold the changes would be confiscatory. They further charge that the ICC, in promulgating new class freight rates, had arrived at its findings on the basis of economic theories rather than on the evidence before it.

Parker McCollester, assistant attorney general of New York state, representing the northern states, declared that the order was predicated on conditions existing before and during the early years of the war and did not reflect conditions as they would exist in the postwar period, when the rates were to become effective.

He said that although the ICC is seeking uniformity in freight rates, the order is concerned only with "class freight" rates and does not cover "commodity," or "exception" rates. He pointed out that the 10 per cent increase in the East would affect 6 per cent of the carload freight, while in the South only 1.8 per cent and in the West only 0.6 per cent of the freight would be affected by the 10 per cent reduction. He admitted that, mile for mile, the class rates in the East are lower than in the South or West, but added that commodity rates are higher.

The railroads testified that the average less-than-carload shipment in 1929 was more than seven tons, but had dropped to between 2 and 4.8 tons just before 1939, because of truck competition, and might rise to no more than 5.2 tons, "if we have prosperity."

Movies Show Development, Operation of Gear Teeth

Two sound movies in color dealing with the theory and generation of gear teeth and related techniques were shown to production engineers, educators and technical editors at a luncheon given by the Fellows Gear Shaper Co., Springfield, Vt., in New York last week.

Following an introduction by Edward W. Miller, vice president and general manager of the company, guests were shown movies of the development and operation of gear teeth. These included pictures of transparent rolling, cross bolted and toothed plastic disks. These demonstrated the generation of involute curves, their uniform speed driving effect one on another, methods of eliminating interference, etc. Also included were what probably are the first moving pictures made by polarized light, showing the actual stress conditions in moving, meshing gears.

The film devoted to the production phases of the subject showed gear shapers in action cutting cams and other shapes as well as gears, gear shaving, lapping and burnishing operations, and use of gear shaper cutters for generating straight and hourglass worms.

Douglas T. Hamilton, publicity manager of the Fellows Gear Shaper Co., announced two 16 mm films—one of 625 feet, the other 1160 feet—will be available on a free loan basis to recognized groups and institutions.

To Blow in Three Stacks As Housing Program Aid

To increase gray and malleable iron foundry products for housing materials and other critical needs, the Civilian Production Administration announced plans last week to blow in three blast furnaces and to increase output of others. The increase in pig iron production will approximate 500,000 tons annually.

Two of the furnaces that would be brought into blast are government owned, one being at Granite City, Ill., and operated by Koppers Coal & Coke Co., and the other being at Gadsden, Ala., operated by Republic Steel Corp. The privately-owned furnace is at Struthers Iron & Steel Co., Struthers, O.

Present, Past and Pending

■ GOODRICH BUYS AIRPLANE WHEEL AND BRAKE PLANT
AKRON, O.—B. F. Goodrich Co. has purchased Hayes Industries Inc.'s airplane wheel and brake division in Jackson, Mich.

■ FORD SUSPENDS TRACTOR OUTPUT AT HIGHLAND PARK
DETROIT—Inability to obtain motor blocks, fans, water pumps, connecting rods, seat springs and hydraulic lift springs from outside suppliers forced Ford to suspend tractor production at its Highland Park plant, requiring layoffs of 2500 and bringing to 48,500 the total now idle in Ford plants.

■ GENERAL MOTORS IN FAVORABLE SUPPLY POSITION
DETROIT—On basis of projected assembly schedules announced last fall, General Motors has lost from the three-month strike an estimated output of 220,000 passenger cars and 130,000 trucks, but from a supply standpoint should be in excellent position to accelerate production to a high level, thereby minimizing the high overhead cost of low-level output being experienced by other builders.

■ INTERNATIONAL HARVESTER MAY SEEK PRICE REVISION
CHICAGO—International Harvester Co. is expected to seek higher prices on its products as a result of a federal fact-finding panel's recommendation that the company increase wages 18 cents an hour. Ten of the firm's plants have been strike-bound since Jan. 21.

■ METAL HOUSEHOLD FURNITURE CEILINGS RAISED
WASHINGTON—Manufacturers of metal household furniture have been granted a 5 per cent increase over their 1941 prices, Office of Price Administration announced last week.

■ PETTIBONE MULLIKEN BUYS FOUNDRY EQUIPMENT FIRM
CHICAGO—Pettibone Mulliken Corp. has purchased all outstanding stock of Beardsley & Piper Co., manufacturer of foundry equipment.

■ WAGE BOOST OF 18 CENTS FAVORED FOR SHIPBUILDERS
WASHINGTON—Shipbuilding Stabilization Conference last week recommended an increase of 18 cents an hour for 500,000 shipbuilders, retroactive to Dec. 4, but will leave application of the increase to the National Wage Stabilization Board.

Prompt Action on Atomic Energy Control Needed, Says Patterson

Secretary of War tells special Senate committee that organization built up to promote atomic bomb development is disintegrating because of lack of defined national policy. Holds uncertainty as to future policy must be removed

ROBERT P. PATTERSON

PROMPT action by Congress in establishing a national power in respect to atomic energy is necessary to safeguard this country's interests, Secretary of War Robert P. Patterson told the Senate Special Committee on Atomic Energy holding hearings on proposed government control.

"For lack of a defined national policy, the organization that was built up during the war to carry forward the development of the atomic bomb is disintegrating," he said. "To allow this effective group of scientists, executives, engineers, and skilled workers to become lost to the field of atomic energy development would be nothing short of a calamity."

Speed is necessary particularly in view of the recommendation made jointly by the United States, Canada, United Kingdom and the Soviet Union that the United Nations set up a commission to study proposed international exchange of information on atomic energy, and proposed international control of the atomic bomb. Other nations are looking to us for guidance, he said, and before we can can help effectively to shape an international system we will have to set our own house in order.

Furthermore, Judge Patterson said, the War Department now has full control over the entire field, and "continuation of this situation is not calculated to advance fully the research and development of peacetime uses of atomic energy, for it is not the primary mission of the War Department to do so. The present uncertainty as to future policy should be cleared up without delay in order to prevent any hindrance to full development of peacetime uses of atomic energy."

Judge Patterson protested the charges that the Army-supported May-Johnson bill is intended to perpetuate military control of atomic energy. It was drafted by a committee of civilians and would set up a civilian agency to take over responsibility. The program which the War Department supports, he said, calls for:

1—A civilian commission for control of atomic energy—a three-man group devoting full time to the activity.

2—Government ownership of fissionable materials.

3—Availability of devices utilizing atomic energy, by means of non-exclusive licenses under private patents and regulation of royalties.

4—Adequate provision for independent research and development.

5—Ultimate use of atomic energy for exclusively peaceful ends, by means of a safe, effective international arrangement.

Judge Patterson objected to the McMahon bill as failing to provide for and recognize the direct concern of the armed services in atomic weapons. "Under the bill," he said, "the Army and Navy would be utter strangers to what was going on . . . . although they might be called on to operate the weapons so developed, on short notice and without knowing what they were." The May-Johnson bill, he said, is much more satisfactory in that it provides effectively for utilization of atomic energy in the national defense.

In the main, Judge Patterson's views coincided largely with those previously submitted to the committee by Secretary of the Navy James Forrestal.

A high-spot of Secretary Forrestal's testimony was his statement that while he did not wish to give the impression the military establishments felt there was no hope of stopping war, he also did not wish to indulge in wishful thinking. Questioned on the practicability of outlawing the use of the atomic bomb in future wars, he replied that it had not been possible to outlaw dynamite and gunpowder. "If war comes," he said, "the atomic bomb will be used."

Capital Goods Supply Situation Seen Becoming Steadily Better

WHILE available deliveries on a number of products in the general classification of "capital goods" stretch many months into the future, the Office of International Trade, Commerce Department, sees no present need for enlarging the positive list of goods that require licenses for export.

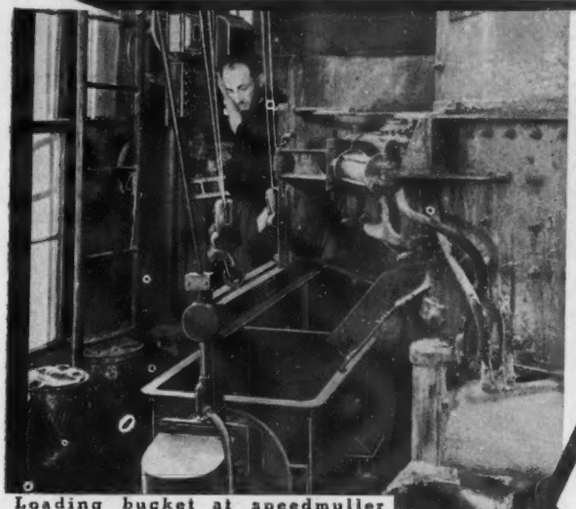
On the whole, OIT sees the supply situation in the capital goods field as becoming steadily easier. It believes, consequently, that continually decreasing aid will have to be extended to foreign buyers and to exporters.

Capital goods on the positive list now include only four items—passenger cars, motor trucks, automotive storage batteries and heavy conveying equipment of the types required particularly in the mining industry.

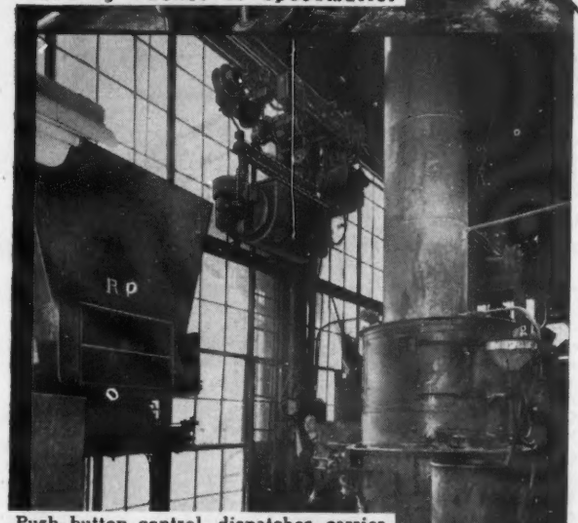
On exports of these four groups of products, limits are in effect. Passenger cars may be exported up to 6.7 per cent of the 1946 production; this percentage is regarded as "normal" because passenger car exports were 6.7 per cent of the output during 1935-1940. Motor truck exports have been set at 21 per cent of the 1946 output—also on the basis of prewar exports.

Automotive type storage batteries may be exported up to the value of $800,000 per quarter; this volume, it is believed, will not hurt domestic consumers because it is slightly less than 2 per cent of total United States output. The limit on storage battery exports was set in view of the lead shortage; this limit will be continued in effect as long as lead is short. Heavy conveying equipment of the earth

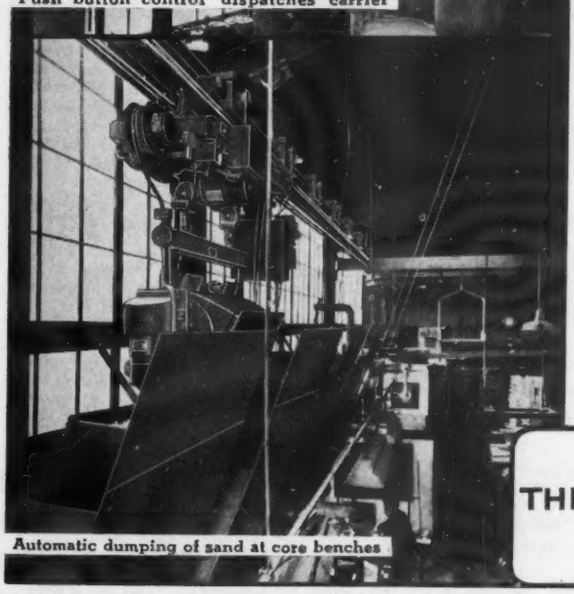
Automatic MONORAIL System



Loading bucket at speedmuller



Push button control dispatches carrier



Automatic dumping of sand at core benches

DELIVERS CORE SAND TO 9 STATIONS

FROM a simple push button control, operator of speedmuller keeps nine core makers supplied with fresh core sand at all times.

This system operates as follows — Self-dumping bucket is lowered to floor at speedmuller to receive core sand. Operator raises bucket with twin hook hoist, sets the station selector and then presses starter button. The unit runs to the proper station and stops — bucket makes complete revolution dumping sand in hopper — whereupon the unit returns to loading station. All this operation occurs automatically, with no further attention from operator.

This is just another of the many automatic systems designed by American MonoRail Engineers using the American MonoTractor. Let us tell you more about this rubber wheel drive unit. An engineer will consult with you without obligation.

THE AMERICAN MONORAIL COMPANY

13102 ATHENS AVE. ● CLEVELAND 7, OHIO

and ore moving types, largely of link-belt construction, is subject to export license by negotiation between the OIT and the Civilian Production Administration, and most licenses are issued when the conveying equipment is wanted with other mining equipment to permit revival of badly needed mineral production abroad.

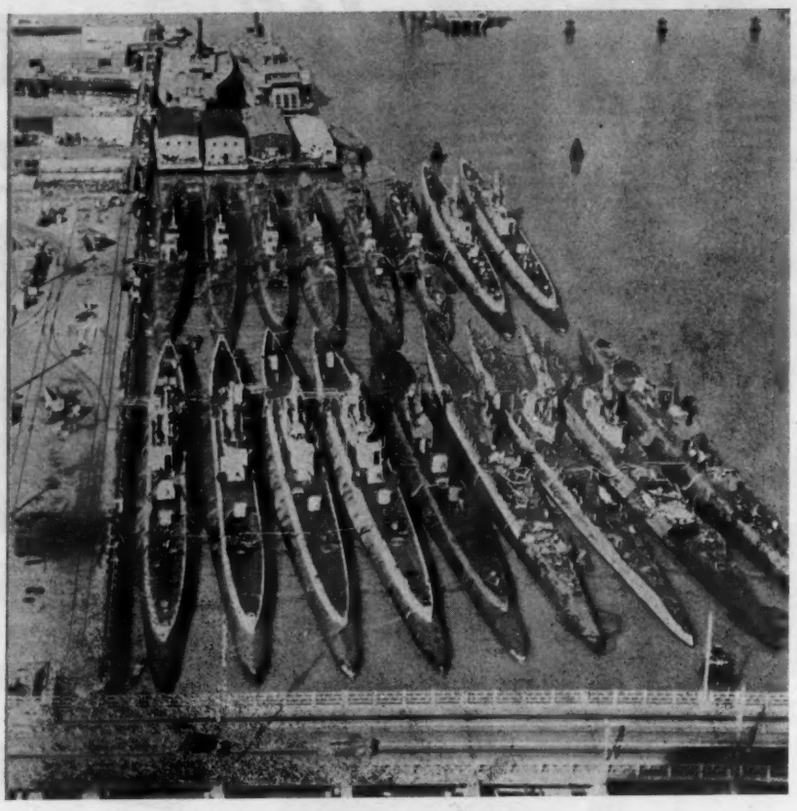
OIT reports that no government assistance is needed to enable foreign buyers to get American machine tools. "There is not a single machine tool that is not in free supply," reports an OIT spokesman. But this does not mean that machine tools are being shipped promptly on export orders. Foreign buyers as a rule are not interested in buying government-owned surplus machine tools. They would rather buy new tools whose condition has not been deteriorated by round-the-clock use during the war. As a result, deliveries ruling on new export orders for machine tools frequently extend as far as six to eight months.

On certain types of machinery deliveries run farther into the future. The situation is bad on textile machinery, particularly spinning machinery and looms; on such equipment the manufacturers are sold two to four years ahead. The OIT has applied for CC priority ratings in some cases where this new machinery is badly needed abroad, but so far the CPA has not granted such priority assistance. Hopes exist in some quarters that additional companies will see their way clear to get into the textile machinery manufacturing field in order to ease this tight situation somewhat.

Heavy Hydraulic Presses Tight

There are other tight items, notably heavy hydraulic presses of the type needed by the automobile industry in its reconversion program; deliveries quoted on such equipment for export range usually from six months to more than a year ahead. A very tight situation also exists in the field of building materials, manufacturing machinery, such as brick molding machinery, concrete block machinery, as well as various types of machinery for woodworking.

Another tight situation exists in farm implements of the kind that are operated behind tractors; export inquiries in many cases are bringing out quotations for delivery more than a year ahead. There are other tight spots here and there; for example, there is a heavy export demand for telephone equipment and in this field the bottleneck is in the supply of desk receivers. Construction equipment generally is regarded as in free supply, largely because of the large amount of surplus government-owned machinery which is in good condition.



IN STORAGE: Submarines are "laid up" at Mare Island shipyard after having been prepared for storage. Preservation steps included overhauling of engines and spray of rust-preventing compound; electronic equipment and instruments are cleaned and stored aboard; deck guns are "packaged" in rubber. NEA photo

More Dealers Licensed To Sell Surplus Tools and Equipment

WAR Assets Corp. has licensed 375 additional dealers to solicit and negotiate sales of government-owned surplus machine tools and production equipment, making a total of 555 "approved dealers" reported to Washington. Various WAC regional offices report an additional 222 approvals.

A partial list of the additional "approved dealers" follows:

Atlanta

Cleveland Electric Co., 557 Marietta St.; C. Y. Strausz & Co., 319 Spring St.; Allison Machinery Co., 575 Edgewood Ave.; Southeastern Purchase & Sales Co., 1608 Candler Bldg.

Birmingham

Tool Engineering Service, 505 N. 22nd St.; Birmingham Armature Electric Co., 821 N. 21st St.; R. E. Boggs, 1427 S. Eighteenth St.

Boston

Terminal Machinery Co., 567 Atlantic Ave.; Standard Machinery & Supply Co.; B. D. Brooks Co. Inc., 361 Atlantic Ave.; Joseph Beal & Co., 465 Atlantic Ave.; Associated Machinery Co., 142 Oliver St.; Lee & Co., 410 Dorchester Ave.

Charlotte, N. C.

Morris Speizman Co. Inc., 508 W. Fifth St.

Chicago

Donberg & Danits, 400 S. Clinton St.; Bansbach Machinery Co., 3911 W. Madison St.; Gilmore Machinery Co., 30 S. Clinton St.; Fader Machinery Co. Inc., 23 N. Jefferson St.; Willis Stutson Associates, 184 N. Wacker Drive; Active Machine & Tool Co., 1036 W. Lake St.; Iron & Steel Products Co., 135th & Brainard Ave.; Segal Machinery Co., 115 S. Clinton St.; Production Service, 162 E. Ontario St.; J. Ralph Roach, 30 N. LaSalle St.; C-Jay Machinery Co., 4456 W. Madison St.; Davis & Murphy, 5252 Broadway.

Cleveland

Dayton Machinery Sales, 3715 E. 104th St.; Tool City Service Corp., 1370 Ontario St.; Rank W. Andersen, Cleveland Railway Bldg.; Cleveland Duplex Mchy. Co. Inc., 626 Penton Bldg.; Collier Co., 8015 Carnegie Ave.; J. J. Dugan & Co., 7100 Euclid Bldg.; Jeffery-Gilles Co., 610 Caxton Bldg.; Strong, Carlisle & Hammond Co., 1392 W. Third St.; Weaver Machinery Co., 1341 E. 111th St.; Noll Equipment Co., 2476 E. Thirteenth St.; L. & W. Machinery Co., 1699 W. 25th St.; Saunders Machinery Exchange, 2036 E. 100th St.; Balcher Machinery Sales, 1861 E. 24th St.; Garco Machinery Co., 3030 Euclid Ave.; Herman Machinery Co., 11107 Earle Ave.; Horvitz Merchandise Co., 1048 St. Clair Ave.; International Steel Industries Co., 205 Marion Bldg.; Lakeside Machinery Co., 1331 St. Clair Ave.; Moslo Machinery Co., 2443 Prospect Ave.; Motch & Merryweather Machinery Co., 715 Penton Bldg.;

Price-Thomas Co., 6928 Carnegie Ave.; A.E.S. Tools Inc., 1948 Carter Rd.; Bardons & Oliver Inc., 1133 W. Ninth St.

Dallas

Pollard Distributing Co., 2307 Madera; Aero Sales Co., 2925 Commerce St.

Denver

Richard Ives Co., 661 W. Colfax; Barnett Co., 3800 Wynkoop St.; Bill Mesch Machinery Supply Co., 716 Nineteenth St.; General Machinery & Supply Co., 635 Walnut St.; Atlas Machinery & Supply Co., 45 South Santa Fe Drive; Great Western Pipe & Supply Co., 1324 Thirteenth St.; Aircraft & Airport Equip. Co., 2705 High St.; Morse Bros. Mach. Co., 2900 Broadway.

Detroit

Surplus Property Service, 1532 Buhl Bldg.; Fero Industrial Equipment Purchasing Co., 1015 Transportation Bldg.; Lenik's Machinery Sales, 12001 Lakepointe; Weyant Machinery Co., 3208 Eaton Tower; W. J. Hatten & Co., 1060 Parker; John W. Rankin, 12834 Marlowe; J. Lee Hackett Co., 1961 E. Milwaukee Ave.; Hanson Equipment Co., 2832 E. Grand Blvd.; Ford Machinery Sales, 417 E. State Fair; John J. Morrow & Co., 5 W. Larned; Welding Sales & Engineering Co., 8750 Grinnell Ave.; Commercial Industrial Corp., 3110 E. 7 Mile Road; Sadler Machinery Co., 7310 Grand River Ave.; Peninsular Machinery Co., 2921 E. Grand Blvd.; Morey Machinery Co., 2832 E. Grand Blvd.; Production Machinery Sales Co., 4845 St. Aubin Ave.; Alvin M. Whirl, 16210 Inverness Ave.; Bradley Machinery Company, 211 Jos. Campau; Marquette Machinery Company, 18423 Greenlawn Ave.; Empire Machinery Exchange, 12207 Hamilton Ave.; Burleigh-Stocker Machinery Co., 1914 Fisher Bldg.; E. R. Hagen, 156 Louise Ave.; Globe Trading Co., 920 W. Lafayette Blvd.; H. C. Slonaker, 1719 Dime Bldg.; Kennametal Inc., 5531 Woodward Ave.; Charles R. Mueller & Sons Inc., 531 E. Lafayette; E. E. Wood Machinery Co., 2832 E. Grand Blvd.

Houston

Engineering Sales Co., 112 Portwood St.; Chickering Tool & Equipment Co., 5001 Navigation Blvd.; Derby-Gibson Machinery Co., 430 Western Union Bldg.; Steel & Machine Tool Sales, 6416 Navigation Blvd.; Huge-Fayle Co., 1011 Caroline St.; Machinery Tool & Engineering Co., 502 Stewart Bldg.; Peden Iron & Steel Co., 700 N. San Jacinto; Preston Machine Tool Sales Co., 724 M & M Bldg.; Machinery Sales & Engineering Service, 1015 Second National Bank Bldg.; Wessendorf, Nelms & Co., 320 Franklin Ave.

Kansas City, Mo.

Ellfeldt Mchy. & Supply Co., 1219 McGee; Schone & Johnson Machinery Co., 1117 Kansas Ave.; Paddock Tool Co., 1418 Walnut St.; Eichman Machinery Co., 235 West Eighth St.; English Brothers Machinery Co., 410 West Fifth St.

Los Angeles

Century Machinery Co., 222 N. Alameda St.; Frank E. Jones Mchy. Corp., 1403 Santa Fe Ave.; Henes-Morgan Mchy. Co. Ltd., 2026 Santa Fe Ave.; Al Heller Mchy. Co., 763 S. San Pedro St.; Eccles & Davies Mchy. Co. Inc., 1910 Santa Fe Ave.; Hoffman & Heartt, 2011 Santa Fe Ave.; Craig Welding Supply Co., 5814 Santa Fe Ave.; Robert L. Hendry, 1231 S. Lorena St.

Minneapolis

Charles W. Stone Co., 1019 Marquette Ave.; John C. Eide Co., 200 Washington Ave.; Machinery Exchange Market, 254 First Ave. N.; Northern Machinery & Supply Co., 818 Lumber Exchange Bldg.; Satterlee Co., 118 Washington Ave.; Machinery Equipment Co., 1300 Washington Ave.; E. J. Koblas or United Hardware Distributing Co., 801 Foshay Tower.

Nashville, Tenn.

Duncan Combs Company, 209 Eighth Ave. North; Tennessee Machinery Company, 121-23 Third Ave.; Hawkins Brothers, 2823 Sharondale Drive.

New Orleans

Dixie Mill Supply Co. Inc., 901 Tchoupitoulas St.; Stauss & Haas Inc., 524 Camp St.; Southern States Equipment Co., 425 Celeste St.; Oliver H. Van Horn Co. Inc., 1742 St. Charles Ave.; Murray-Baker-Frederic Inc., 628 South Peters St.; Frederic & Baker, 725 Canal Bldg.

OSCAR L. CHAPMAN

Heading the Department of Interior until a new secretary is named will be Mr. Chapman, assistant secretary under Harold L. Ickes, who resigned in a huff when the President questioned the veracity of his testimony before a Senate Committee concerning Edwin W. Pauley, Mr. Truman's nominee to be under secretary of Navy

New York

Richard P. Walsh Co., 30 Church St.; Hodge & Hammond Inc., 1162 Grinnell Place; Hubert J. Burke, 4 Park Ave.; Norwalk Lock Co., 395 Broadway; U. S. Machinery & Motor Co., 395 Broadway; Consolidated Products Co. Inc., 15 Park Row; Interstate Industries Inc., 149 Broadway; John F. O'Mahony, 79 Madison Ave.; Stephen A. Douglass Co., 630 Fort Washington Ave.; Gerard Machinery Co., 30 Rockefeller Plaza; Aaron Machinery Co., 45 Crosby St.; Howard F. Wehrle, 1919 Broadway; Kent L. Sonnenberg, 870 Seventh Ave.; Edward L. Carter, 30 Rockefeller Plaza; J. W. Lerew & Co., 405 Lexington Ave.; Foreign Supply Co., 141 Broadway; R. G. Miller Co., 30 Church St.; Douglas Machinery Co. Inc., 150 Broadway; Jerome Eichler, 475 Fifth Ave.; C. H. Kellow, 110 E. 42nd St.; Bennett Machinery Co., 30 Church St.; Chas. L. Wachter Engineers, 55 West 42nd St.; Royal Machinery Exchange, 401 Broome St.; Industrial Plants Corp., 90 W. Broadway; Industrial & Marine Service Co., 30 Church St.; Globe Machinery Co., 214 Centre St.; Rudel Machinery Co. Inc., 100 E. 42nd St.; Amer-Ind Inc., 420 Madison Ave.; Victory Cable Co., 217 East 5th St.; National Machinery Exchange, 128 Mott St.; R. Greenberg, 15 Park Row; Harrington-Wilson-Brown Co., 405 Lexington Ave.; F. B. Cutter Co., 50 Church St.; Vandyck Churchill Co., 114 Liberty St.; Welding Engineering Sales Corp., 110 E. 42nd St.; Associated Woodworking Machinery Corp., 23 Howard St.; Capitol Machinery Corp., 253 Centre St.; William J. Lohn Inc., 203 Centre St.; State Mill Supply Co., 98 Park Place; F. S. Strite, 601 W. 144th St.; Acme Machinery Co., 40 Elizabeth St.; Connolly Merchandising Inc., Empire State Bldg.; E. J. Sales Co., 1457 Broadway; E. B. Packard Co. Inc., 114 Liberty St.; Frederick G. Schranz, 90 W. Broadway; Milton Elster for the Elster Sales Co., 475 Fifth Ave.

Tulsa, Okla.

Machine Tool & Supply Co., 215 E. First St.; Marshall Supply & Equipment Co., 109 W. First St.; J. R. Lawrence, manufacturers' agent, 702 Ritz Bldg.; Tulsoma Supply & Equipment Co., 224 E. Fourth.

Omaha, Nebr.

T. S. McShane Co., 1113 Howard St.

Philadelphia

Delta Equipment Co., 148 N. Third St.; H. Loeb & Son, 4643 Lancaster Ave.; Albert Hepworth, 2311 N. Sixteenth St.; Delaware Equipment Co., 124 N. Third St.; Hahn & Brandt Machinery Co., 465 N. Fifth St.; Clarence J. O'Brien, 1032 Commercial Trust Bldg.; Commercial Electric Motor Co., 116 N. Third St.; O'Brien Machinery Co., 113 N. Third St.; Kamis Engineering Co., Third & Moore Sts.; Ajax Machinery Co., 138 N. Third St.; Ace Equipment & Salvage Co., 141 N. Third St.; Machinery & Metals Co., Commercial Trust Bldg.; Joseph Hyman & Sons, Tioga, Livingston & Almond Sts.; Mickleburgh Machinery Co., 117 N. Fourth St.; Hochman Machinery Co., 720 Chestnut St.; Swind Machinery Co., Broad St. Station Bldg.; L. M. Gilbert Co., 516 Drexel Bldg.; Mfr's. Sales & Equip. Co., 18 W. Chelten Ave.; S. Mann Co., 1630 Vine St.; James A. Condon, 1710 Fourteenth N. and Fifth St.; G. Raymond Koehler, 1733 N. Fifth St.; Philadelphia Transformer Co., 2829 Cedar St.; Adelphia Equipment, 341 N. Third St.

Portland

Portland Machinery Co., 208 S.W. First Ave.; Feenaughty Machinery Co., 112 S.E. Belmont St.; Westland Equipment Co., 660 N. Tillamook; Star Machinery Co., 801 S.W. Front Ave.; J. E. Haseltine & Co., 115 S.W. Second Ave.; Clyde Equipment Co., 1631 N.W. Thurman St.; Schnitzer & Wolf Machinery Co., 900 S.W. First Ave.; Clyde P. Carroll, 121 S.W. First Ave.; Jack Helser Machinery Co., 235 N.W. Second Ave.; George E. Zweifel & Co., 103 S.W. Front Ave.; Balzer Machinery Co., 2136 S.E. Eighth Ave.

Washington

Power Machinery, 1498 H St., N.E.; Diacal Corp., 801 Tower Bldg.; T. W. Newton, 960 F Street; United States Industries Inc., 1025 Fifteenth St.; Machine Steel Products Corp., 1525 I St.; William S. McCormick, 1611 Park Rd., N.W.; Kirk Machinery Corp., 1420 New York Ave.

St. Louis

K. P. Wesseling Co., 1221 Locust St.; E. L. Klauber Machinery Co., 3221 Olive St.; Clements Welding Supply Co., 709 Academy Ave.

Salt Lake City, Utah

Mine & Smelter Supply Co., 121 West Second South; Western Salvage & Supply Co., 220 West South Temple St.; Salt Lake Hardware Co., 105 N. Third West; Bogue Supply Company, 741 W. Fourth South St.

Seattle

West Coast Machinery Co., 1006 First Ave. So.; Buckner-Weatherby Co. Inc., 1743 First Ave. South; Superior Steel Co., 1117 Third Ave.; Kinnane Machinery Co., 2727 First Ave., South; Pickering Machinery Co., 2729 First Ave., South; Perine Machinery & Supply Co. Inc., 1921 First Ave. South; Dawson Machinery Co., 2737 First Ave., South; Star Machinery Co., 1741 First Ave. South; Sundfelt Equipment Co., 3422 First Ave. South; Hallidie Machinery Co., 2245 First Ave. South.

Spokane

W. R. Matthews Machinery & Tool Supply Co., W. 421 Second Ave.; American Machinery Works, 1027 W. Broadway; Fred M. Viles & Co. Inc., E. 124 Trent Ave.; Modern Machinery Co. Inc., N. 2417 Division.

Multiple Tenancy of War Plants To Be Encouraged

The Senate Small Business Committee staff now is writing a bill to encourage "multiple tenancy" of large government-owned war plants. The bill under preparation would call for formation of public corporations which would administer the use of space in these plants.

Russia Plans To Increase Automobile Production to Million Units by 1950

Fourth five-year plan calls for development of Ural mountains region as well as restoration of western industries wrecked during invasion by Germans. Molotov province on western slope of Urals figures prominently in metalworking development

RUSSIA'S fourth five-year plan will be devoted to raising the productive capacity of the Ural mountains area, undamaged and in fact developed during the war, as well as to restoring as quickly as possible the wrecked industries and transportation facilities of the regions overrun by the Germans.

One of the aims of the program is to achieve production of 1,000,000 cars and trucks a year by 1950. This would compare with an output of 200,000 vehicles annually before the war.

The program includes reconversion and expansion of existing plants which have been devoted to war work and the building of some new factories. The "Detroit" of Russia will be Gorky where the Molotov factory will be expanded to turn out 1000 cars and trucks a day by the end of the current plan. Output of this plant will include two types of passenger cars and 2-ton and 2½-ton trucks.

The great Stalin factory at Moscow will build large Z.I.S.-110s, an 8-cylinder, seven passenger car developing 140 horsepower and the most handsome motor car yet produced by the Soviets. The Stalin factory at Miassi in the Urals, construction of which was started in 1941 and which now holds a large amount of the machinery from the Moscow plant, will be further developed.

Heavy diesel trucks will be turned out at the Yaroslav works and several more new truck plants to be located in the Ukraine and Georgia are in the blueprint stage.

Figuring prominently in the Russian plan to expand the iron and steel industry to 50 million tons of pig iron and 60 million tons of steel ingots is a program for developing the Molotov province on the western slope of the Urals. Here the plan calls for 65 hydroelectric stations on 25 Ural rivers for a total capacity of 2,500,000 kilowatts and an average electric output of 9 billion kilowatt hours.

Resources of the Molotov province are enormous and recent studies indicate it has greater potentialities than the eastern slope of the Urals. Coal resources are estimated at several billion tons. Russian geologists claim there is more oil in the Urals than in either Iran or Iraq. Iron ore resources are believed to total many millions of tons of high-grade ore, free of or low in sulphur and phosphorus but containing such valuable admixtures as vanadium and titanium.

According to L. M. Herman, U.S.S.R. Section, Office of World Trade Promotion, Department of Commerce, the ore resources of the Molotov province consist of four major deposit groups: The Vishera, Chusovaya, Kizel and Komi-Permian. One deposit in this group is the Kutim iron glance deposit with an iron content of 67-69 per cent, which compares favorably with the well-known iron glance deposits of Elba Island.

During the war, a number of iron and steel facilities, including blast furnaces, bessemers, open hearths and coke batteries were constructed in the Molotov province.

In the process of evacuation from the invaded areas, the province gained several dozen machinery building enterprises, including several thousand machine tools and presses.

Many nonferrous metals are available in the Molotov province, including chromium, vanadium, titanium, manganese, nickel and others. Supplies of limestone for furnace charges, refractory materials and molding sand are adequate.

Members of a World Federation of Trade Unions commission, on a fact finding tour of the occupied zones in Germany, are shown in Berlin. Left to right are: Sir Walter Citrine, president of the federation; Sidney Hillman, president of the Amalgamated Clothing Workers of America and head of the Political Action Committee of the CIO; Michel Tarrasev, secretary of the Central Council of Soviet Trade Unions; and Leon Jouhaux, secretary-general of the French federation. NEA photo

Japs To Melt War Weapons To Reclaim Steel

Thirty submarines, rifles, artillery pieces, tanks and other arms expected to provide two million tons of steel

JAPANESE military weapons will be melted down to make steel for the Japanese reconstruction program and officials in charge of the rehabilitation work estimate 2 million tons will be made available within the next 12 to 18 months. Included in the military equipment are 30 submarines, as well as rifles, artillery pieces and tanks.

Col. R. J. Ballard, economics officer of the Eighth Army's military government section, has announced that the program is being conducted by the Japanese Committee for the Disposal of Destroyed War Weapons, headed by T. Komatsu, formerly representative of Japanese steel interests in the United States.

The committee is charged with the collection and smelting of all scrap metal and weapons into ingots and the channeling of this steel into reconversion uses. It also will distribute usable metals which need not be remelted, such as communications instruments, electrical equipment, ball bearings and tubing.

Exempted from the remelting program will be the 1000 bells collected from Buddhist temples when Japanese militarists were scraping the bottom of the metals barrel. The bells will be returned to the temples from which they were taken.

Japan's five largest steel companies are co-operating in the plan as a non-profit venture. The price of steel will be fixed to cover only bare costs.

Colonel Ballard has warned the Japanese that the steel program should keep pace with the mounting coal production. He predicted the latter will reach 1,500,000 tons a month by March 1 and that the steel industry will be expected to begin to meet essential domestic needs by April 1.

England Feels Impact Of War-Deferred Demand

Impact of war-deferred demands began to be felt by the English steel industry last fall, and, since then, has been marked by substantial domestic orders as well as expanding exports, according to reports from American sources in London.

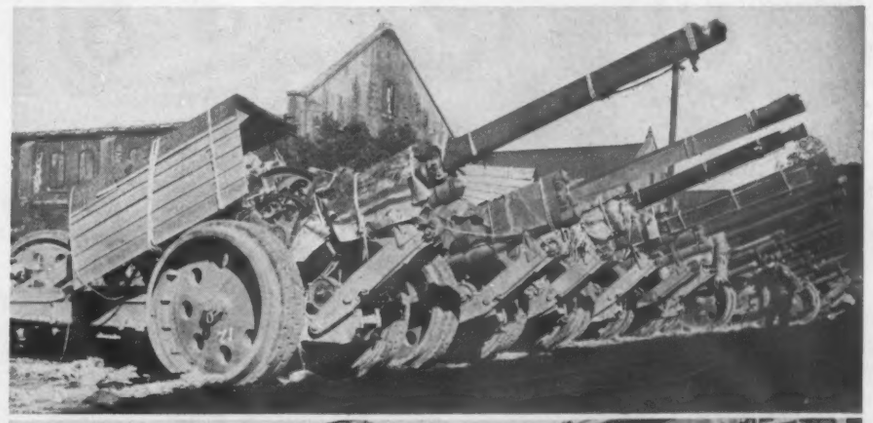
The early stages were marked by materials shortages, which compelled rerollers to utilize what were frankly cataloged as "defective materials" in production of billets, blooms, and other stock.

All melting plants attained capacity operation, with steel ingot production being maintained at high levels to keep rolling mills supplied. There was a sharp demand reported for plates, sheets, and sections, but with long delays in delivery being reported. Plate mills, for instance, were reported 12 to 16 weeks behind on orders, in contrast to an earlier postwar period when they were looking for business. Mills making black and galvanized sheet have been under orders for their full production, with a considerable backlog, while there is a heavy demand reported for bars, light sections and strip, primarily for shipment to Norway, Sweden, Holland and France. Export railway equipment also is in demand. There was a demand for special steels, cast alloys, and cast iron scrap, it was stated.

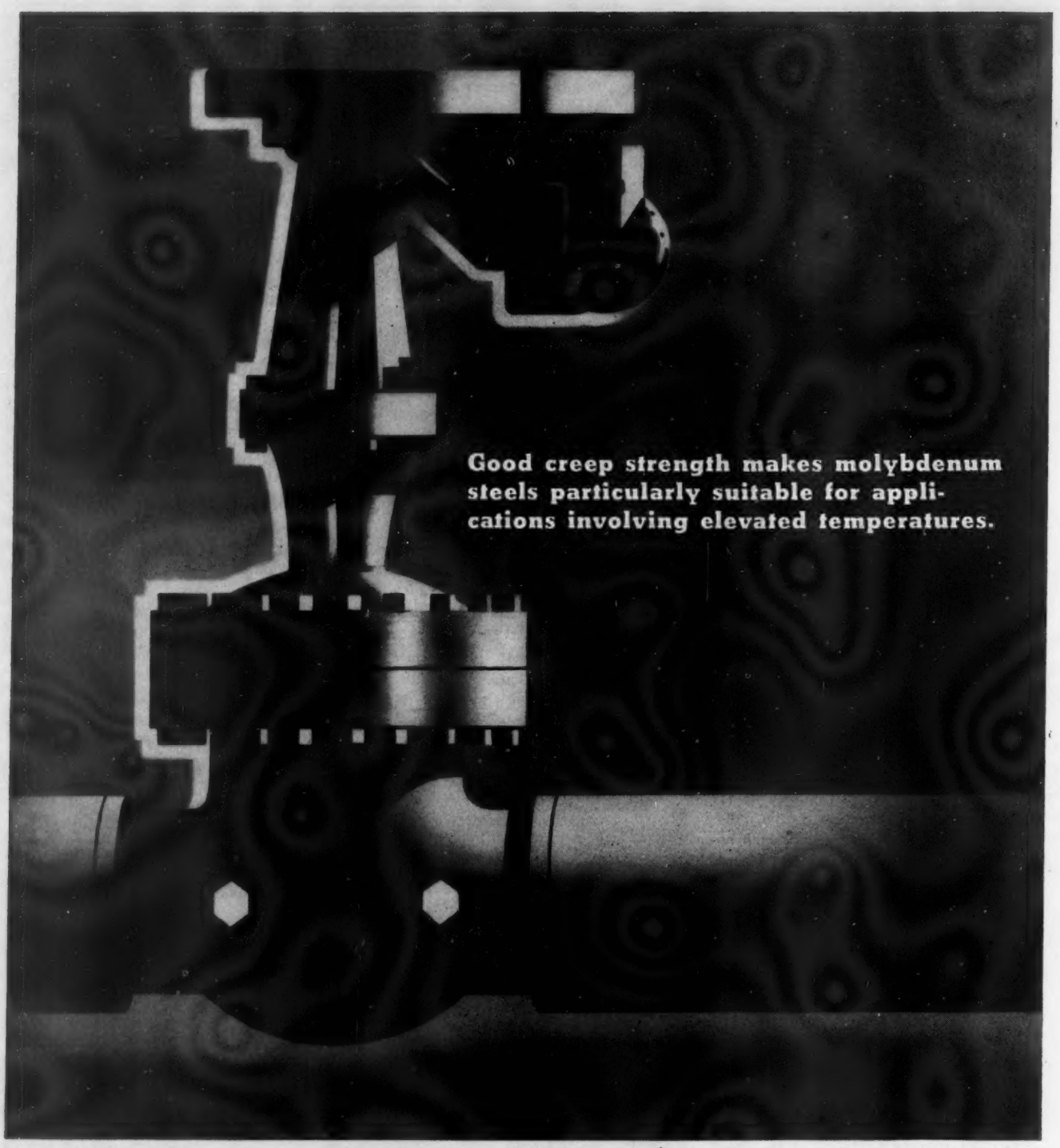
India Must Replace Much Of Its Textile Machinery

Fifty per cent of India's spinning and weaving machinery must be replaced within the next 10 years, it is estimated by American observers in that country.

For the first five years, it is anticipated, requirements will include 3,300,000 spindles, 50,000 looms, besides quantities of dyeing, bleaching, printing and finishing machinery, with 24,000 flat revolving cards, 2000 draw frames. This is based on a consumption of 12 yards of cotton cloth per year per capita.



Japanese military equipment collected from all over the defeated country is shown here at a Tokyo arsenal where it is being inspected and stored. Later, part of this equipment may be used for reparations payments. Top photo shows Jap artillery pieces, similar to the Germans' 88 guns, which were to be used by the Japs to repel an invasion of the home islands. Lower photo shows a trainload of Japanese tanks. NEA photos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By A. H. ALLEN *Detroit Editor, STEEL*

Settlement of steel strike leaves automobile makers and parts suppliers in confusion concerning prices for their products. "Funny business" uncovered in surplus tool sales brings investigation by Federal Bureau of Investigation

DETROIT

ANNOUNCEMENT of a so-called "wage-price formula" in connection with settlement of the steel strike brought in its wake only confusion worse confounded. Parts suppliers made idle by the steelworkers' strike found themselves faced with the necessity of negotiating new contracts with their union locals, even though they had signed contracts before the strike. They likewise saw scant prospects of any resumption of steel shipments before two to three weeks. Meanwhile they were at a complete loss to know what to do regarding prices. Basic rules of the government's new prescription require approval of both wage and price increases, but as yet there is absolutely no mechanism for effecting either, and so production continued in the worst stall it has ever known.

Business Initiative Required

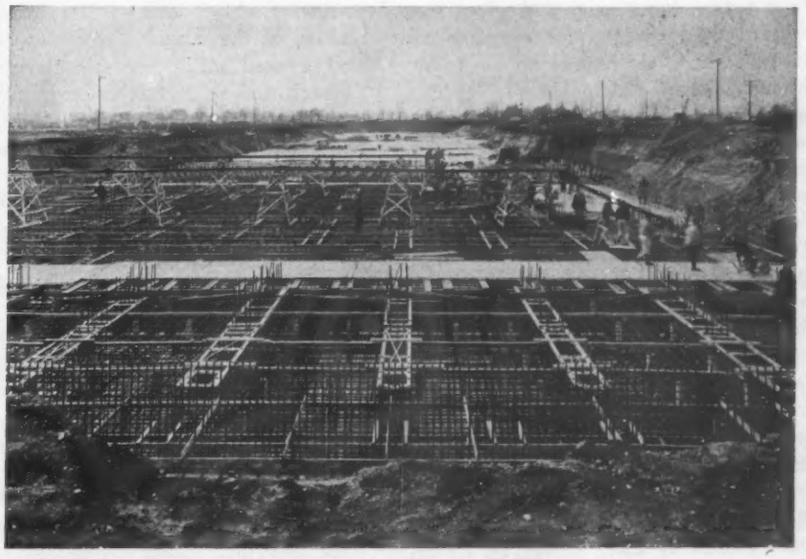
What seemed to be called for was bold action on the part of manufacturers, but boldness has long since disappeared as a characteristic of business leaders. Instead of waiting for the detailed rules to filter down from Washington to regional offices, some managements were wondering whether they should not negotiate new wage agreements at once with their employees, following the pattern of 18½ cents an hour, give general 15 per cent increases to all salaried personnel, then figure new costs on the basis of a 15 per cent increase in labor, a 10 per cent increase in material (the $5 per ton advance in steel averages to 10 per cent), a 15 per cent increase in overhead. Adding a reasonable profit margin to such cost figures would give a price figure which could immediately be sent to all customers, as effective at once, and production might be able to proceed.

If there was concerted action along these lines among enough manufacturers —and the plan follows the lines of the newly-enunciated wage-price hocus-pocus —then approval of government agencies would ensue as a matter of course. No one knows better than price control and stabilization agencies in Washington the long delay which would have to accompany the filing of applications for wage and price increases and the waiting for their approval. What is called for now is the aggressive determination of manufacturers to cut through the red tape and say . . . . here is the wage scale, here are the cost estimates, here are the prices, start the machinery going and the shipments moving, and if there is any argument with OPA or OES we'll worry about that later.

The blasting away at price control in newspaper advertisements and public statements, logical and sound though it may be, will do no good, simply because the plan is not politically expedient and because people generally are guided by their emotions and not by their reason. The best way now to make the most of a situation rapidly getting out of hand is to start production and delineate individual wage-price paths in the conviction that the tottering hulk of government directives sooner or later will disintegrate by incomprehension.

The telegrams are all ready in plants of General Motors divisions to dispatch to suppliers, instructing resumption of full shipments of materials and parts—in fact they have been ready for a couple of weeks, but the strike drags on. The 90-day tieup has been settled in the press a dozen times; apparently the negotiating parties do not subscribe to what they read.

Latest twisting of the issues by the UAW looks to be a matter of Walter P. Reuther trying to save his face, since there is virtual agreement on the question of wages in view of the national pattern being set. Arguments turned to the question of seniority provisions and maintenance-of-membership clauses. The latter requires the corporation to dismiss employees who do not maintain their union membership, and GM is of no mind to continue this arrangement, which was a wartime directive of the WLB. Its objections to the union's seniority demands center on the proviso that promotions shall be made on the basis of seniority, where merit and ability are equal. Such a stipulation was a part of the recently negotiated Chrysler contract, and does



PRESS PIT: Construction of a large press pit is underway at the new stamping plant of the Fisher Body Division of General Motors at Hamilton, O. Pit will be 800 feet long, 160 feet wide, and 20 feet deep to accommodate more than 100 presses, some of them weighing up to a million pounds and capable of stamping out a turret top at a single blow

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PEACETIME MODEL: Flight view of the model 18 Beechcraft made by Beech Aircraft Corp., Wichita, Kans., which has completed reconversion from military to commercial type planes. This all-metal twin-engine plane is now being produced in volume

not appear out of line with other union contracts. Perhaps what GM objects to is the wording, which might be changed to read: Promotions shall be made on the basis of merit and ability, except where these are equal, in which case seniority shall be the determining factor.

In regard to maintenance-of-membership, the decision of a Canadian arbitrator in the Ford Motor of Canada case appears to have bearing. He ruled that the company shall deduct union dues from the paychecks of every man in the plant, although it is not required that every man in the plant be a member of the union. This removes the "stigma" of union membership from those who do not care for it, and still gives the union a dues checkoff for everyone in the plant. It would require no one to be dismissed for refusal to "belong" to the union. However—and this is an important further provision—any strike must be authorized by a majority vote of every man in the plant, not just a majority of those union members who feel like voting. Too often strikes can be authorized by 20 or 30 per cent of a plant's employees who may not accurately reflect the sentiments of the majority. These two interesting clauses might prove an equitable basis for settling many disputes in this country which revolve over these issues. General Motors, in fact, has already indicated its willingness to accept a dues checkoff system—but only for union members. A checkoff system for nonmembers might be regarded by them simply as a form of job insurance and not as payment of union membership dues.

Some of the surplus tool sales in former war plants in this area have taken a curious turn, in one case at least bringing on an FBI investigation. This sale, at an outstate plant, was advertised to start at 8:30 a.m. and included a number of machine tools of particular interest to a Detroit machinery interest. A representative of the latter company was on hand promptly and moved into the plant as soon as the doors were opened in the morning. Locating the machines in which he was interested, he was amazed to find "sold" tags attached to all of them, the indicated buyer being a well-known Michigan manufacturer. Investigating a little further as to why this manufacturer should want these machines, the machinery man found the company had not bought them at all, and was not in the least interested in such type machines. More sleuthing uncovered the fact one of the financial backers of the manufacturer also operated a used machinery sales house in Chicago, and apparently to cover up the fact the machines were being bought for resale had used the manufacturer's name as buyer.

Taking advantage of the lull in manufacturing operations, General Motors' standards engineers have launched an extensive program of standardization of power tool screw drivers, nut runners, shanks, spindles, etc. There are literally hundreds of thousands of assorted sizes and types of power tools used in automotive plants, and the various sizes of bits and shanks in use have been determined more or less at the whim of the master mechanic or tool supervisor at the individual plant, resulting in scores of sizes and little interchangeability. By getting together all the tools and power units currently in use, sorting and classifying them, it was possible to eliminate hundreds of sizes and standardize on a dozen or so that would cover all requirements.

The study showed the way to a number of further savings, in addition to standardization. For example, it was determined that the use of standard size shanks, fitted with short driving bits, would yield savings in that the short bits would be discarded when worn instead of having to be sent out for resharpening as was the case with the one-piece shank and bit.

Collaborating in the study were manufacturers of power tools and bits. A new development being demonstrated by one of these companies is a high-cycle tool which operates on 360-cycle current at a speed of 21,000 rpm and weighs only half as much as a 180-cycle unit with speed of 10,000 rpm. Difficulty of standardizing on the high-cycle type, of course, would be chiefly an electric one, requiring frequency changer or motor-generator sets for supplying the high-frequency current, along with perhaps separate power lines and other auxiliaries. Nevertheless, the trend in power tools is definitely toward the higher speed type, which brings with it the need for extra precautions in respect to safety, since there are definite limits to speeds at which chucks, grinding wheels and similar units can be operated without blowing apart in the operator's face.

New Vibration Damper Introduced

An unusual type of vibration damper for internal combustion engines, claimed to provide a simple solution to torsional vibration problems, has been announced by the Houde Engineering Division of Houdaille-Hershey Corp. It comprises three parts only . . . the damper mass, its housing and a bronze bushing; the viscous substance used is the newly-developed silicone fluid, selected because of its stability and nearly flat viscosity curve which permits constant operating characteristics regardless of temperature ranges or changes.

The housing is attached rigidly to the engine crankshaft while the inner, free-running damper mass, in reality a flywheel, is separated from it by a thin film of fluid. Because of the high viscosity of the fluid, the damper mass rotates at engine speed; when the minute plus and minus changes in velocity which produce vibration are transmitted from the crankshaft to the housing, the damper mass or flywheel, being heavy in comparison, tends to continue to rotate at constant speed. The damper is untuned and is claimed therefore to minimize both major and minor critical orders of vibration.

Ford estimates it will be March 15 before assemblies can be moved back to a rate of 500 per day, in comparison with the 3000 per day which were being turned out prior to the shutdown resulting from the steel strike.

Finishing

In designing die castings which are to be plated, all significant areas should be made accessible for buffing. A brilliant luster cannot be obtained in those areas which the buffing wheel cannot reach. This — and the following salient facts — should be considered when castings are to be plated:

1. *Deep or narrow recesses are difficult to plate and they tend to entrap the buffing compound.*
2. *Generous radii in re-entrant angles prevent the necessity for applying excessive thickness of plate to meet minimum coating requirements at the radii.*
3. *Sharp outside edges, corners and points should be avoided because deposits on such areas tend to be rough and brittle.*
4. *Convex surfaces are easier to plate than flat surfaces or deep concave areas.*
5. *Where beads are used for decorative effects, buffing is facilitated if the beads are parallel to the length of the casting and in the plane of the buffing wheel.*

The zinc alloy die casting shown here (a control panel for an electric range) is a good example of designing for ease of finishing. The decorative beads run parallel to the length of the casting and the spaces between the beads are finished in black enamel to contrast with the overall plating of the part. The lettering below the control knob openings is recessed and also finished in the contrasting black enamel. All recesses are shallow and all significant areas can be reached by the buffing wheel.

Additional data on designing for ease of finishing will be found in our booklet "Designing For Die Casting". To insure that you will get the most from your die casting dollar, ask us—or your die casting source—for a copy of this booklet.

THE NEW JERSEY ZINC COMPANY
160 Front St., New York 7, N. Y.

ZINC
FOR DIE CASTING ALLOYS

The Research was done, the Alloys were developed, and most Die Castings are based on
HORSE HEAD SPECIAL (99.99+% Uniform Quality) ZINC

Carnegie-Illinois Contracts for New Furnaces

New equipment and rebuilding of old will give Gary, Ind., strip mill one of largest capacities in world

CARNEGIE-ILLINOIS Steel Corp., subsidiary of U. S. Steel Corp., has contracted for two new slab heating furnaces and the rebuilding of three existing slab heating furnaces for its Gary, Ind., works.

The expansion will give the Carnegie-Illinois strip mill at Gary one of the largest capacities in the world.

The contract was awarded to Rust Furnace Co., Pittsburgh, which will make the installations, including machinery and foundations, without interrupting mill operations.

Each of the five furnaces will have a capacity of 105 tons an hour. This contrasts with a rated capacity of 60 tons an hour for the three existing furnaces, although they were run at a considerably higher figure during the war. The five-unit arrangement will materially improve furnace efficiency and life, eliminating need for exceeding rated capacity.

In hot strip production, lack of sufficient furnace capacity has frequently been a bottleneck.

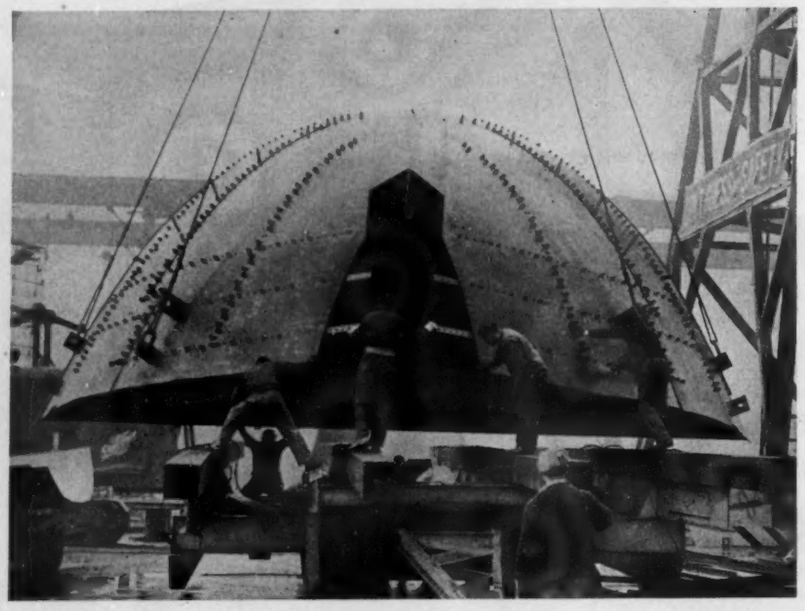
The new and rebuilt furnaces will have a heating rate in excess of 150 lb of steel per sq ft of effective hearth area an hour. They will heat slabs 3½ in. to 7½ in. thick; 18 in. to 76 in. wide; and 6 ft to 18 ft long.

All furnaces will be Rust triple-fired, zone controlled types, automatically operated in regard to furnace temperature, pressure and combustion. All will be fired with coke oven gas.

Alloy metal type recuperators will deliver preheated air at 700 F to the furnaces. After the recuperators, waste gas will be converted to operate steam boilers, whose capacity will be enlarged to utilize the additional heating capacity.

The very highest grade refractories adaptable to such use will be installed throughout the heating zones.

The contractor will furnish and erect all necessary pusher machinery and furnace roll tables; remove and reinstall certain mill machinery; provide all necessary concrete foundations for extensions of existing mill buildings and for the furnaces; and install electrical equipment for furnace operation.



BOTTOMS UP: Sounds like a toast? Invert the "turtle shell" and you'll get the idea. This is the prefabricated stern of one of six 12,800-ton cargo ships being built by the American South African Line in United States Steel's Federal shipyard at Kearny, N. J. Seven assembly shop riggers are guiding the 23-ton unit aboard a trailer for the trip to the building way

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Foundry Equipment Co., Cleveland, has acquired the corporate name, trade name, good will, patents, drawings and other assets of McCann Furnace Co., that city, and will continue manufacture of the McCann line of furnace and oven equipment.

—o—

Attwood Iron Industries, Grand Rapids, Mich., has announced plans to begin production of gray iron, semi-steel and ferrous castings by spring. The new company is affiliated with Attwood Brass Works, Grand Rapids.

—o—

Fairbanks, Morse & Co., Chicago, has appointed Milwaukee Machinery Co., Portland, Oreg., and Cascade Machinery Co., Seattle, as distributors.

—o—

Hammond Iron Works, Warren, Pa., has appointed the following as distributors: P. M. Kline Co., Cleveland; and Oilman's Service & Supply Co., Boston.

—o—

Willamette Iron & Steel Corp., Portland, Oreg., has offered its plant and physical assets for sale.

—o—

International Nickel Co. Inc., New York, has opened a St. Louis Technical Section of its Development & Research Division at Ambassador Bldg., 311 N. Seventh St., St. Louis 1.

—o—

Southern States Iron Roofing Co., Savannah, Ga., has opened facilities at 521 N. 28th St., Birmingham, to manufacture aluminum roofing.

—o—

Tyler Fixture Corp., Niles, Mich., manufacturer of commercial refrigeration cases and home refrigerators and freezers, has opened a branch factory at Waxahachie, Tex.

—o—

Lodge & Shipley Machine Tool Co., Cincinnati, has appointed Rudel Machinery Co. Inc., Boston, as exclusive sales representative for Maine, Vermont, New Hampshire, Massachusetts and Rhode Island.

—o—

American Can Co., New York, has announced plans for a new can manufacturing plant to be built at Ft. Smith, Ark., at a cost of approximately $1 million.

—o—

Air Reduction Sales Co., Baltimore, has plans to acquire and operate two

of the oxygen plants it operated during the war, one at Sparrows Point, Md., the other on Patapsco avenue, Baltimore.

—o—

Sheffield Steel Corp., subsidiary of American Rolling Mill Co., Middletown, O., plans to establish a district office at El Paso, Tex., to serve eastern Arizona, New Mexico, western Texas and northern Mexico.

—o—

Globe Tool & Molded Products Co., Rockford, Ill., and Imperial Die Casting Co. have merged and will operate under the name of Globe Imperial Corp.

—o—

National Roll & Foundry Co., Avonmore, Pa., has purchased Pottstown Pipe Products Co., Pottstown, Pa., and will continue production of the latter company's line of pipe nipples.

—o—

American Brake Shoe Co., New York, has shortened the name of its abrasion-resistant material, ABK Ni-Hard Alloy, to ABK Metal.

—o—

Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., has acquired Davis Boring Tool Division, Larkin Packer Co. Inc., St. Louis, and all standard and special boring bars and cutters formerly manufactured in St. Louis will be made at Fond du Lac.

—o—

Harris-Karp-Goldsmith & Co., Cincinnati, commercial investors, has acquired control of Smith & Mills Co., that city, which will continue production of its line of machine tools.

—o—

Version Allsteel Press Co., Chicago, has announced plans to begin construction in Dallas, Tex., within a month of a $500,000 metal products manufacturing plant.

—o—

Kaiser Co. Inc., Iron & Steel Division, Oakland, Calif., has opened a district sales office at 307 Hoge Bldg., Seattle.

Brown Instrument Co. Adds Sales, Service Engineers

Twenty-four sales engineers and 11 service engineers have been added by the Brown Instrument Co. and have been assigned to branch offices of Minneapolis-Honeywell Regulator Co., Minneapolis, of which the Brown company is the industrial division.

The sales engineers and offices to which they have been assigned are: D. L. Russell, Boston; A. F. Cecere, Hartford, Conn.; J. A. Rorex, Houston, Tex.; R. Mitchell, A. D. Mayo Jr., and H. W. Greisback, Chicago; C. C. Spousta Jr. and A. R. Willy, Indianapolis; D. F. DeVine, Portland, Oreg.; W. H. Palmer and Ross Hubley, Minneapolis; J. Dunlap, Toledo, O.; H. W. Araucz, Detroit; A. T. Challman, San Francisco; H. T. Noonan, Buffalo; L. T. Macgill and A. M. Zellar, Philadelphia; C. McIntire, Cincinnati; R. D. Bailey, Washington; J. F. Stein, St. Louis; H. W. Sinewe, Pittsburgh; R. A. Wolfe and E. G. Brown, New York; and R. F. Bruckart, Cleveland.

Service engineers and cities to which they are assigned are: G. F. Neill and C. Vivion, Atlanta; W. W. Weaver, Boston; J. J. Asklar, Hartford, Conn.; C. Hornbacker and J. P. Chuchman, Chicago; M. T. Glass, Dallas, Tex.; A. T. Nicholls, Buffalo; A. Bernard, Montreal, Canada; O. P. Kelly, Syracuse, N. Y.; and H. E. Luther, Indianapolis.

Die Casting and Plating Firms To Vote on Merger

Officers and directors of Michigan Die Casting Co., Detroit, and Gerity-Adrian Mfg. Corp., Adrian, Mich., have approved a merger of their companies. Stockholders of both firms will meet on March 4 to vote upon ratification of the agreement.

The plan is said to offer many advantages to both companies, as Gerity-Adrian specializes in chrome, cadmium and silver plating of die castings for automotive and other parts and also manufactures its own line of plumbing and bathroom fixtures; as such, it is a large purchaser of die castings. Michigan Die Casting Co., on the other hand, is a quantity buyer of plating since it sells a substantial portion of its output in finished form.

Harris Foundry & Machine To Make Farm Implements

Construction has begun on an addition to Harris Foundry & Machine Co., Cordele, Ga., hydraulic press manufacturer. The expansion will result in creation of a Farm Implement Division which envisions doing a half million dollar volume of business during the remainder of the first half of the year with expectations of sales valued at one and one-half million dollars for the year. To meet this demand, the company's foundry is being enlarged to ten times its present capacity.

The division will occupy a concrete and steel building with approximately 26,000 sq ft of floor space and will require doubling the present employment of the company.

Management of the company is centered in T. R. Harris, president and general manager, and R. C. Harris, vice president and assistant manager, grandsons of the founder, R. C. Harris.

Consider Plans For Developing New Ore Field

Quebec and Labrador deposits thought to contain at least 300 million tons of readily-available ore

ACTIVE mining operation may soon develop in iron ore deposits recently uncovered in the northern Quebec and adjacent Labrador territories, according to Jonathan Robinson, minister of mines for the province of Quebec.

Among the most important of the projects planned for development of the Quebec-Labrador properties is construction of a railroad north from a terminal on the St. Lawrence river, building of electric power plants, and setting up of towns, dock and road facilities.

These would be conditional on assurance that there would be at least 300 million tons of iron ore readily available.

At the end of the 1945 mining season, field reports to the office of the controlling company, Hollinger Consolidated, are reported to have indicated surface showings totaling a million tons a vertical foot of high grade iron ore. This was on combined concessions held by Hollinger, North Shore Exploration, and Labrador Mining & Exploration. It was said that in addition three other responsible mining organizations have applied to the Quebec government for iron ore concessions in the area.

Maurice L. Duplessis, Quebec premier, said recently that expenditures totaling at least $200 million are involved in the early stages of the new development, of which the proposed railway from mines to tidewater would represent $70 million.

The Quebec-Labrador iron ore deposits occur in a belt known as the Labrador Trough, extending southward around 350 miles from Ungava bay and averaging about 30 miles in width. The Quebec portion of the trough lies north of the Labrador part, because boundary lines follow peak points of the watersheds. The area, it is said, could be served by a 350-mile railroad along the Romaine river.

Singer Sewing Machine To Expand Canadian Plant

Singer Sewing Machine Co. with plants in St. Johns and Thurso, Canada, plans expansion of the St. Johns plant at a cost of $5,150,000. This plant will manufacture motors.

Fabricators Await Price Relief; May Retard Strike Settlements

Processors say they are unable to meet union demands for wage increase until they are granted higher ceilings to compensate for higher prices they must pay for steel. Three to six months may elapse before normal production is resumed

LOS ANGELES

SLOW progress in settling strikes in the steel fabricating industries until the Office of Price Administration acts on price increases already requested is predicted by Harold Ware of the negotiating committee of Los Angeles steel foundry management groups.

"The basic steel settlement includes a price increase of about 10 per cent to mills," Mr. Ware said.

"It is obvious that fabricating industries cannot meet union demands under the old price system because they will be paying more for steel and also for labor if wages are increased.

"The OPA is expected to move fast in granting the necessary increases. But until the agency acts there is little that can be done to meet union conditions of settlement. We are waiting for action on prices."

John Despol, West Coast representative of the United Steelworkers, pointed out that deadlocks exist in fabricating plant negotiations on open shop and other issues in addition to wages.

About 20,000 workers continue idle in foundries and other steel processing industries.

Basic steel producers have resumed operations and will be returned to normal production as soon as possible.

Normal Operations Being Resumed

L. J. Soracco, general superintendent of the Bethlehem Steel Corp. plant at Vernon, announced that normal operations are being resumed immediately, with all of the more than 500 employees requested to contact plant offices for information on working schedules.

A similar announcement came from F. C. Todd, Bethlehem works manager, who added that it would be late in the week before full production in open-hearth and rolling mill departments would get under way.

At the United States Steel Corp. (Columbia) plant at Torrance fires were lighted late on Saturday within a few hours after news of strike settlements had been received.

J. S. Moore, master mechanic at the Torrance works, who, with a crew of six remained inside the factory continuously since the strike began, described the work stoppage period as the most orderly in Southern California strike history.

Three of the four Columbia open hearths were slated to be in operation by the week-end following the strike settlement.

George Smith, assistant director of the Metal Trades Manufacturers Association of Southern California, disclosed that opinion among fabricators and processors placed resumption of capacity production at from three to six months due to expected delays in shipments from the East and partial depletion of warehouse stocks in the area.

Telephone Company Plans $400 Million Expansion

SAN FRANCISCO

A program of wide importance to metal-producing industries has been announced here by Pacific Telephone & Telegraph Co., which plans to spend $400 million on new construction during the next five years.

This expenditure, for new plants and buildings, for extension of service lines, and for equipment, will be started immediately and is expected to reach $100 million between now and the end of the year. The entire program is conditioned, however, on availability of materials and manpower, general economic conditions and the state of the money market.

Consummation of the program, the company pointed out, will increase its plant investment 50 per cent to a total of more than a billion dollars.

International Harvester Building New Truck Plant

SAN FRANCISCO

International Harvester Co. has leased five acres of industrial property at Emeryville, on the east side of San Francisco bay, as a site for construction of a motor truck assembly plant. Six models of heavy duty trucks will be produced in the new factory, which will employ 250 to 300 workers.

West Coast Firm Acquired By Republic Steel Corp.

Republic Steel Corp., Cleveland, has acquired the machinery, equipment, and inventory of Westland Drawn Steel Co., Los Angeles.

Republic has taken a short-term lease on Westland's buildings and property, but plans to remove the machinery and equipment to another location.

The facilities will be operated by Republic as part of its Union Drawn Steel Division, Massillon, O.

FIRST POSTWAR RUBBER: First shipment of plantation rubber to land in Los Angeles harbor in five years is unloaded from a freighter. The shipment, totaling 2600 tons and originating in Ceylon, is sufficient to make 520,000 passenger tires. NEA photo

California Steelmaking Operations To Be Nearly Normal by March 1

Month will be required before normal flow of finished products made on Coast can be resumed. Longer time will be needed to obtain products from East. Ending of strike expected to revive interest in bidding for government-owned Geneva plant

SAN FRANCISCO

ENDING of the steel strike has brought rapid resumption of steel producing and fabricating operations in the northern California area, and activity approaching normal is expected to be reached by March 1 or sooner.

As this was written, however, a number of metal industry companies still were suspended by the machinists' strike, which has halted work in 205 plants since last Oct. 29. Settlement of the steel dispute is expected to influence an early end of the machinists' walkout. Thus for the first time in months, San Francisco can see the prospect of labor peace, although some quarters are predicting a new outbreak of wage demands some six or eight months hence.

Columbia Steel Co., the largest single steel enterprise in this area, reopened its plant at Pittsburg, Monday morning, Feb. 18, four weeks and two days after its workers went on strike. Approximately 2600 workers were affected by the walkout at Pittsburg.

Columbia also operates a plant at Torrance, in Southern California, where 1400 workers struck. Another 450 workers were out at the firm's blast furnace and iron mine in Utah.

Lag in Delivery Time Unpredictable

At reopening of the plant on Monday, Columbia officials said three to four days would be required to put the Provo, Utah, blast furnaces into operations, and at least a week would be necessary to resume normal operation of the rolling mills at Pittsburg. It was believed that nearly two weeks in all would be necessary to bring all operations into normal activity. Columbia officials refused to predict how soon a normal flow of deliveries could be resumed, but indicated that consumers should not expect deliveries in volume until mid-March at the earliest.

This lag between ending of the strike and resumption of normal deliveries will affect fabricating companies variously. For example, steel products which are not made on the Coast, or made in only small volume, will be considerably slower in reaching the Coast than materials which are produced here. Thus, firms that had depleted or exhausted material stockpiles during the strike and which now must await shipments from eastern mills may be weeks or months in getting back to normal.

Steelworkers viewed the strike settlement without much jubilance. Delaney Gallus, secretary of the CIO United Steelworkers Local 1798, said "we feel we could have gotten a 25 per cent increase, and we feel also that it wasn't necessary to give producers a $5 increase in price."

Ending of the steel strike is expected to bring a renewed interest in the disposal of the Geneva mill. During the strike, prospective bidders were too snarled in strike matters to give Geneva more than second place in their planning. Now that the price-wage problem has been settled, at least temporarily, they can figure with more certainty what Geneva's prospects are.

Steel circles here continue to believe that United States Steel Corp. will make an offer for the plant before bidding ends April 1. Henry Kaiser also hinted that he has made a "firm offer," but refused to give further details. The Kaiser bid, if actually on file, probably represents that of the "Kaiser Syndicate," an organization of western business, industrial and banking interests which Mr. Kaiser formed last summer.

California Metal Trades Manufacturers Warn Wage Increases May Blight Growth

AN AVERAGE rise of even 1 per cent in wages paid by metal trades industries in Los Angeles may put the area out of competition with the rest of the United States and bring to a stop the growth of Southern California as an American industrial center.

This conclusion was intimated in a report by the Metal Trades Manufacturing Association of Southern California. It is regarded as one of the most important documents made public in recent history of the region.

Claiming impartiality, the report said, "the Metal Trades Manufacturers' association emphasizes the need of an earnest study of factual data on wages and earnings in this area.

"It is simple to speak of $2 per day increases in wage rates, or 17½ cents per hour, or 30 per cent raises, so far as Bethlehem and Pittsburgh are concerned, or Indianapolis, Cincinnati, Birmingham, Dallas or Cleveland.

"But before applying these or similar blanket increases to the Los Angeles area, the final results should be carefully weighed.

"Tons of steel and iron castings are made in the Middle West and East and shipped into Los Angeles for 2¼ to 2½ cents a pound less (freight charges included) than they can be obtained for locally.

"Although costs of raw materials are naturally somewhat lower in the East, eastern foundry workers are no more efficient and eastern management is no better. What then is the reason for the differential?"

Answering this question, the report continued:

"Comparing all regions of the United States, the Los Angeles-San Francisco area is third highest in average hourly earnings. Only Detroit and Seattle are higher. The average hourly earnings in all steel and iron foundries in the U. S. is 98 cents. The Los Angeles-San Francisco area average is $1.08.

"In actual wage rates for key production jobs in the steel and iron foundry industry, this same California area is equal to or higher than any other region of the nation. The coremaker in the East averages from $1.03 to $1.20 an hour. The national average is $1.19 per hour. The Los Angeles-San Francisco average is $1.29 an hour.

"The national average for molders is $1.19 an hour; the L.A.-S.F. average is $1.29.

"Even common labor shows a spread of 53 to 84 cents per hour throughout the East, South and Middle West, with an average of 71 cents per hour for the whole country. The California region averages 86 cents."

The cost of living in Los Angeles has gone up 29 per cent since January, 1941, according to government figures quoted in the association's report. During the same period the average hourly earnings of workers in Southern California steel foundries have increased 39.4 per cent.

MEN of industry

CHARLES B. WIGGIN

CARL J. SNYDER.

V. G. BRETTMAN

Charles B. Wiggin has been elected vice president and general sales manager of the National Can Corp., New York. Mr. Wiggin is also treasurer and a director of the corporation.

—o—

Carl J. Snyder has been appointed general staff master mechanic, Chrysler Corp., Detroit, succeeding **D. F. Flater,** who has resigned. **D. A. Samson** has been appointed budget director.

—o—

Col. V. G. Brettman, General Staff Corps, recently discharged from the Army, has joined the advertising staff of STEEL as assistant district manager in the Chicago and Milwaukee area. He succeeds **Vaughn W. Volk,** who has been transferred to the main office in Cleveland. Prior to his Army career, Colonel Brettman was account executive for 15 years with Fowle Printing Co., Milwaukee, and later advertising and sales promotion manager, Guiberson Corp., Dallas, Tex.

—o—

Capt. John A. Strother has rejoined Pitney-Bowes Inc., Stamford, Conn., to serve in the newly created post of director of development and research. Captain Strother joined the service in 1940.

—o—

S. J. Mergenhagen has been appointed district representative in Philadelphia, Heppenstall Co., Pittsburgh.

—o—

Dr. Sanford A. Moss, a consulting engineer with General Electric Co., Schenectady, N. Y., has been elected a fellow of the Institute of the Aeronautical Sciences.

—o—

Wilmot F. Wheeler has been elected president, American Chain & Cable Co., Bridgeport, Conn., succeeding the late **William T. Morris.** Mr. Wheeler has been with the company since 1916 and has served as executive vice president and treasurer since 1936. **Cyrus N. Johns** has been elected executive vice president and **Stanley Mann,** treasurer.

—o—

H. W. Hartman recently was named works superintendent, American works, American Steel & Wire Co., Cleveland. His former position of works superintendent, Newburgh wire works, has been assigned to **J. E. Brown.** In the company's purchasing department, **Duncan C. Macdonald** has retired as district purchasing agent at Worcester, Mass., as has **Robert R. Buckley,** district purchasing agent at Cleveland. **Roger W. Berrett** has been named assistant purchasing agent with headquarters in Cleveland. **T. M. Haddock** succeeds Mr. Buckley as Cleveland district purchasing agent while **Martin A. Blinn** is district purchasing agent at Worcester.

—o—

Lawrence A. Pomeroy Jr. has been appointed traffic manager, National Malleable & Steel Castings Co., Cleveland. He succeeds **Carl L. Stripp,** who retires after 26 years' service.

—o—

Donald L. Colwell, who, during the war, served as co-ordinator of conservation, Navy Department and previously had been nonferrous section chief, Conservation Division, War Production Board, has returned from a special assignment with the U. S. Strategic Bombing Survey in Japan, and has become associated with National Smelting Co., Cleveland.

—o—

C. L. Richards has been named special representative of the Scale Division, Fairbanks, Morse & Co., and will make his headquarters in Chicago. Mr. Richards was a member of the National Bureau of Standards staff for 19 years.

—o—

Charles E. Andrews, after serving 25 years as a director, Whitehead Bros. Co., New York, and New England manager of the company for more than 41 years, retired Dec. 31. He is succeeded as New England district sales manager by **F. B. Clarke,** who has been associated with the Whitehead company for the past 28 years.

—o—

At the recent annual meeting of the Shafer Bearing Corp., Chicago, the following officers were elected: President, **Ray P. Tennes;** executive vice president and general manager, **J. F. Ditzell;** vice president in charge of engineering, **A. H. Williams;** vice president, **M. J. Tennes Jr.;** secretary, **I. B. Lipson;** treasurer, **A. H. Gray;** assistant treasurer, **E. H. Ferguson,** and comptroller, **H. P. Lucas. O. W. Schmidt** has been appointed national sales manager. Mr. Schmidt served during the war as a major with the Air Technical Service Command.

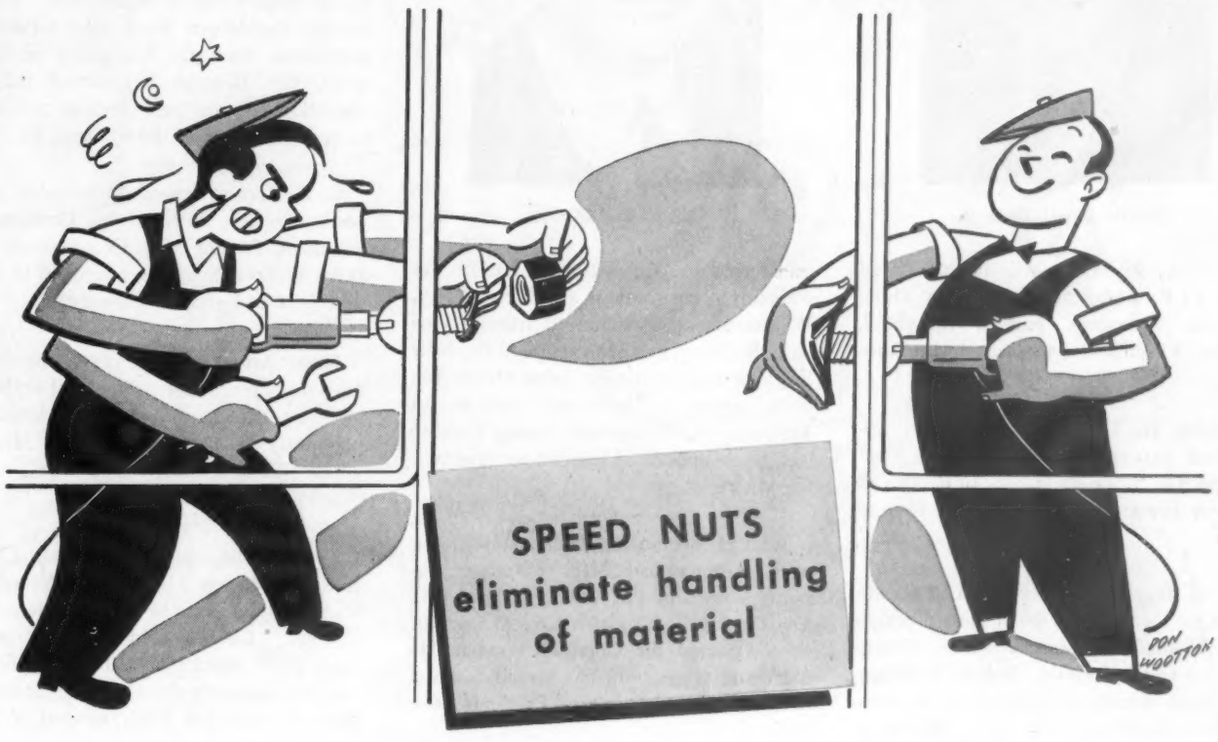
—o—

Joseph W. Zvone has been appointed chief engineer, United States Steel Supply Co., Chicago. Mr. Zvone, during the war a lieutenant in the Navy, served as ships superintendent at Pearl Harbor.

—o—

Russell L. Peck has been appointed refractories engineer, Norton Co., Worces-

It takes a 4-arm man to keep up with a SPEED NUT Assembler



And even with 4 arms, we'll wager he couldn't keep up. For it stands to reason a man just can't handle a lock washer, threaded nut and a wrench as fast as he could handle a Speed Nut alone.

You don't need lock washers with Speed Nuts, for Speed Nuts are self-locking. The arched prongs and base build up a double, spring tension lock as the Speed Nut is tightened down . . . definitely preventing vibration loosening.

You don't need a wrench with Speed Nuts because slight finger pressure is sufficient to keep them from turning as they are pulled down tight

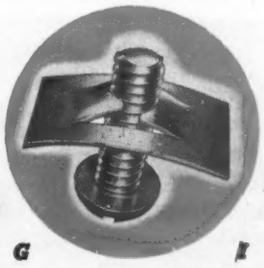
All this adds up to worth-while savings, when you stop to think how many nuts, bolts and screws are used to assemble your product. And don't forget, you won't have to buy lock washers, or provide means for stocking them.

Surely you're interested in reducing your assembly costs without reducing the quality of your product. So write us today for literature or send in your assembly details.

TINNERMAN PRODUCTS, INC.

2039 FULTON ROAD, CLEVELAND 13, OHIO

In Canada:	Wallace Barnes Co., Ltd., Hamilton, Ontario
In England:	Simmonds Aerocessories, Ltd., London
In France:	Aerocessoires Simmonds, S. A., Paris
In Australia:	Simmonds Aerocessories, Pty. Ltd., Melbourne



Speed Nuts* PATENTED

MORE THAN 3000 SHAPES AND SIZES

* Trade Mark Reg. U. S. Pat. Off.

FASTEST THING IN FASTENINGS

EDWIN R. FELLOWS II

JOHN H. SEATON

ter, Mass., where he will be associated with **F. E. Leiby** and will cover Philadelphia, Delaware, eastern Maryland, eastern Virginia and eastern North Carolina.

—o—

Edwin R. Fellows II has been appointed export manager, Fellows Gear Shaper Co., Springfield, Vt., to handle all matters pertaining to export and foreign sales.

—o—

F. C. Traver, formerly with Gates Rubber Co., Denver, has been named manager, Molded Products Division, Hewitt Rubber Corp., Buffalo. **Robert A. Nilsen** has been appointed production superintendent, Restfoam, and **L. C. Holloman,** formerly of the production department, has been appointed to the sales staff in charge of Restfoam product development.

—o—

Howard N. Girardin has been appointed assistant to the president, Empire Tool Co., Detroit, and continues also as sales manager. **Harlow E. Ohr** has been made director of production control and purchases.

—o—

Arno A. Schubert has joined Allis-Chalmers Mfg. Co., Milwaukee, to engage in sales promotion in the machine tool industries. **O. P. Donohue** has been promoted to the sales promotion staff, specializing in the heating, ventilating and air conditioning industries.

—o—

John L. Peebles, president and general manager, Peden Iron & Steel Co., Houston, Tex., has been appointed chairman of the domestic trade committee, Houston Chamber of Commerce.

—o—

Meade Johnson has been appointed marketing manager, Yale & Towne Mfg. Co., Stamford, Conn. **Frank Boxwell** has been appointed manager, builders' hardware sales; **R. T. Mitchell,** formerly manager, contract hardware sales, has been transferred to Washington to handle the company's government contracts; **V. A. Waldron,** recently returned from service with the Navy, has been assigned the New England sales territory; **John Meyer** has been appointed hardware salesman for Kentucky and Tennessee; **George Cannon** has been appointed hardware salesman for Michigan.

—o—

John H. Seaton has been named manager, Aeronautical Mfg. Division, formerly known as the DeIcer & Fuel Cell Division, B. F. Goodrich Co., Akron. Mr. Seaton joined the Goodrich company in 1927 and since 1942 has served as chief design engineer, Industrial Products Division.

—o—

Charles A. Reinbolt Jr., who formerly handled sales promotion for the American Central Mfg. Corp., Connersville, Ind., has been appointed advertising and sales promotion manager.

—o—

W. D. Cleavenger has been appointed Chicago district manager, American Welding & Mfg. Co., Warren, O. Mr. Cleavenger replaces **F. L. Schneider** who has joined Wallace Supplies Mfg. Co., Chicago. **Henry H. Knapp** has been named service engineer of the company's Railway Equipment Division.

—o—

Frank D. Newbury, who joined the Westinghouse Electric Corp., Pittsburgh, in 1901 as an apprentice engineer, and who became a vice president recently, has been elected a member of the corporation's board of directors. **L. E. Osborne,** who joined Westinghouse at the age of 16 as a clerk in the tool room, recently was named senior operating vice president.

—o—

Max Miller, Detroit, has been appointed sales manager, Duraloy Co., Scottdale, Pa. Mr. Miller formerly was associated with the company's representative, F. B. Cornell & Associates, in a sales engineering capacity.

—o—

Jack Carlson has been named district sales manager of the Kaiser Co. Inc., Iron & Steel Division, at its newly opened offices in Seattle.

—o—

Theodore Herman has been named manager of claims, Bethlehem Pacific Coast Steel Corp., Los Angeles. Since joining Bethlehem Steel Co., following graduation from the University of Missouri, Mr. Herman has served in the operating, claims and contract terminations department at Bethlehem, Pa.

—o—

G. F. Reznor, son of the founder, succeeds the late **William M. Graham** as president, Reznor Mfg. Co., Mercer, Pa. **Dave Webster** has been promoted to vice president and general manager.

—o—

Jerry Arseneau has been appointed sales manager, Tacoma Steel & Engineering Co., Tacoma, Wash. Mr. Arseneau previously was associated with Minneapolis Steel Construction Co., and Seattle Steel Co. Inc.

—o—

F. C. Flosi, treasurer, A. M. Castle & Co., Chicago, has been elected to the additional posts of vice president and director. **George Gibbs,** former president, Gibbs Steel Co., Milwaukee, which was merged with the Castle company in January, also has been elected a vice president.

—o—

Ralph Bachman succeeds **Hal Babbitt** as public relations director, Kaiser Co. shipyards at Portland, Oreg. Mr. Babbitt has been appointed West Coast public relations director for the Kaiser-Frazer Corp., at Long Beach, Calif.

—o—

William P. Getty has been appointed assistant to the manager of raw materials, Jones & Laughlin Steel Corp., Pittsburgh. Mr. Getty joined Jones & Laughlin in 1936 and prior to his present appointment was connected with the metallurgical department.

—o—

J. R. Lawrence has been named representative in the southwest territory for Iron & Steel Products Inc., Chicago. He will have headquarters in Tulsa, Okla.

—o—

J. F. Harrison, chief engineer and works manager, Buffalo-Springfield Roller Co., Springfield, O., has been promoted to vice president in charge of engineering and manufacturing.

—o—

Dow Chemical Co., Midland, Mich., announces the following additions to its Magnesium Sales Division staff: **J. D.**

Need Answers about Shearing Stainless?

Shear Blades?
What tolerances are recommended on blades for shearing E-S Type 304 Stainless? Can we use the same blades on E-S Type 316?

Fine Perforating?
What is the smallest diameter hole that can be accurately punched in 30-gage E-S Type 302 sheet, and what is the minimum spacing that will not tear between perforations?

Clearance for Blanking?
What die clearance should we use for blanking 6-in. circles in No. 7-gage E-S Type 410 plate?

Clean Slitting?
In slitting and drawing small louvres in E-S Type 321 Stainless, the metal sometimes strings across the slit. How can we overcome this?

Die Changes?
Will E-S Type 430 break out when stamped? Can we use the same dies in stamping E-S Type 430 that we use in stamping E-S Type 347?

Anneal to Trim?
After spinning E-S Type 304 bowls, we want the edge soft enough for trimming and corrugating, without a second anneal. Is this possible?

ask Eastern for the answer when Stainless is the question

Questions like these are "duck soup" at Eastern. Many of the answers are given in the big new catalog, "Eastern Stainless Steel Sheets," but if you have a specific question about cutting or shearing Stainless, be sure to ask Eastern...where your inquiry is welcome. JMLCo-E-B1

EASTERN STAINLESS STEEL CORPORATION
BALTIMORE 3, MARYLAND • Distributors stock available in most areas
CHICAGO · CLEVELAND · DALLAS · DETROIT · LOS ANGELES · NEWARK · PHILADELPHIA

ES

Garinger, transferred from the Bay City Division to Chicago; **Lt. Col. Guy DeKuiper,** recently returned from the Army, assigned to the Washington office; **Lt. Leland Wallace Jr.,** who recently joined the company, will work in St. Louis.

—o—

J. Elbert Johnson, J. Frank Curry, and **Jack E. Williams** recently were released from the armed forces and have rejoined Alabama By-Products Corp., Birmingham, and its subsidiary, ABC Coal & Coke Co., as sales representatives.

—o—

Shannon Crandall has retired as president, California Hardware Co., Los Angeles, and has assumed the position of chairman of the board. **Walter W. Coulson** succeeds Mr. Crandall as president; **Shannon Crandall Jr.** has become executive vice president and **E. P. Hallock,** vice president and sales manager.

—o—

A. L. Atherton has been named advisory engineer and **Fred C. Heyl,** manager, quality control department, East Springfield, Mass., plant, Westinghouse Electric Corp. **D. J. Mosshart** is the new engineering manager for the stoker department, Steam Division at Philadelphia. **H. D. Moreland** has been appointed manager of the company's X-Ray Division, Baltimore.

—o—

American Institute of Electrical Engineers, New York, announces the following have been nominated to serve as officers beginning Aug. 1, 1946: President, **J. Elmer Housley,** district power manager, Aluminum Co. of America, Alcoa, Tenn.; vice presidents, northeastern district, **Ernest W. Davis,** chief electrical engineer, Simplex Wire & Cable Co., Cambridge, Mass.; New York city district, **O. E. Buckley,** president, Bell Telephone Laboratories Inc., New York; Great Lakes district, **T. G. LeClair,** supervising development engineer, Commonwealth Edison Co., Chicago; southwest district, **R. F. Danner,** general superintendent, Oklahoma Gas & Electric Co., Oklahoma City, Okla.; northwest district, **Charles Foster Terrell,** vice president, Puget Sound Power & Light Co., Seattle; directors, **J. F. Fairman,** vice president, Consolidated Edison Co. of New York Inc., New York, **Raymond T. Henry,** chief electrical engineer, Buffalo, Niagara & Eastern Power Corp., Buffalo, **E. P. Yerkes,** engineer of equipment and buildings, Eastern Area, Bell Telephone Co. of Pa., Philadlephia; treasurer, **W. I. Slichter,** professor emeritus of electrical engineering, Columbia University, New York.

—o—

D. Ray Park, recently returned from service with the Navy, has been elected vice president in charge of sales, Smith & Caffrey Co., Syracuse, N. Y. Mr. Park was sales manager of the company prior to entering the service.

—o—

American Hoist & Derrick Co., St. Paul, recently elected the following officers: **Frederic Crosby,** chairman of the board and executive committee; **Harold O. Washburn,** president; **Stanley M. Hunter,** vice president, sales; **D. B. Botkin,** vice president, manufacturing; **James F. Bishop,** secretary and treasurer, and **Robert J. Henry,** assistant secretary.

—o—

William B. Meek, until recently manager of the Midwest District, St. Louis, Westinghouse Electric Supply Co., has been appointed assistant general manager of the company.

—o—

Wagner Electric Corp., St. Louis, announces territory changes in its Electrical Sales Division. **L. J. Dicianne** is branch manager, Houston, Tex., serving the territory including Texas, Oklahoma, and parts of New Mexico, Arkansas and Louisiana; **A. G. Viola,** branch manager, Kansas City branch, serving the territory of Kansas, Nebraska and western halves of Iowa and Missouri. **J. L. Pasher,** for many years manager, Automotive Division, Pittsburgh branch territory, now is in charge of the Electrical and Automotive Divisions in that city.

—o—

John Armour Porter, who resigned recently as a commander with the Navy, has become associated with Armour's Pattern Shop Co., welding engineers, Worcester, Mass., as vice president and clerk of the corporation.

—o—

N. F. Vanderlipp has joined Kellett Aircraft Corp., Upper Darby, Pa., as works manager in charge of all production activities. Mr. Vanderlipp served for 2½ years as executive engineer and general manager, Buffalo plant, Curtiss-Wright Corp., and factory manager of that company's Columbus, O., plant.

—o—

C. S. Munson Jr., following 4½ years' active duty with the Navy, has returned to the Vanadium Corp. of America, New York, and has been appointed assistant to general manager of sales.

—o—

Lt. Col. Charles H. Greenall, now director of research, Frankford Arsenal, will take up duties as executive director, Franklin Institute Laboratories, Philadelphia, on or about April 1. **Dr. Henry Butler Allen,** secretary and director of the institute, will continue in overall charge of the research work at the laboratories.

—o—

R. L. Fowler, chairman of the board, Florence Stove Co., Gardner, Mass., has

R. W. BURTON

Who has been appointed manager, Jones & Laughlin Steel Service Inc., New York, noted in STEEL, Feb. 18 issue, p. 84.

ALICE D. PRIGG

Who recently was appointed purchasing agent, Washington Steel Corp., Washington, Pa., noted in STEEL, Feb. 18 issue, p. 84.

ROBERT L. HEATH

Who is in charge of metallurgical services to railroads, Chicago, Climax Molybdenum Co., noted in STEEL, Feb. 18 issue, p. 84.

C. L. HARDY

Who has been appointed manager, Philadelphia plant, Joseph T. Ryerson & Son Inc., noted in STEEL, Feb. 4 issue, p. 116.

H. W. DEUKER

Recently named works manager, Cincinnati plants, Manufacturing Division, Crosley Corp., noted in STEEL, Feb. 4 issue, p. 114.

M. C. DELANEY

Who has been appointed secretary and treasurer, Southern States Iron Roofing Co., Savannah, Ga., noted in STEEL, Feb. 18 issue, p. 86.

been elected president to succeed **Eugene Holland** who has resigned as president and director. Mr. Fowler also continues as chairman.

—o—

Frank G. Shaub has been appointed Detroit representative for the Chambersburg Engineering Co., Chambersburg, Pa.

—o—

J. E. Nyhan, for more than 11 years assistant to the president, National Founders Association, Chicago, has resigned that office. He formerly was national secretary of the National Metal Trades Association, and he is returning to that organization for the development of a special project in the nature of research and experimentation in the field of industrial relations.

—o—

D. P. Samson has been appointed manager of foundry sales, American Car & Foundry Co., New York. Mr. Samson succeeds **G. A. England** who has transferred to the Operating Division of the foundries and will be located at St. Louis.

—o—

Dr. Vannevar Bush, executive president, Carnegie Institution of Washington, is the recipient of the Washington award for 1946, presented at the Palmer House, Chicago, Feb. 20. Dr. Bush, who in 1940 was appointed chairman of the National Defense Research Committee and later was made director of the Office of Scientific Research and Development, received the honor in recognition of his outstanding leadership in organizing and directing the scientific resources of the nation during the war. The Washington award was founded in 1916 by John W. Alvord and is administered by the Western Society of Engineers on recommendation of a commission representing the American Society of Civil Engineers, American Institute of Mining & Metallurgical Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, and Western Society of Engineers.

OBITUARIES...

John J. Brown, 73, chairman of the boards, Foster Wheeler Corp., New York, and Foster Wheeler Ltd., St. Catherines, Ont., died Feb. 15 in New York. Mr. Brown became vice president, Wheeler Condenser & Engineering Co., New York, in 1907, was elected president in 1918, and upon consolidation in 1922 of the Wheeler company and the Power Specialty Co. as Foster Wheeler Corp., became chairman of the board.

—o—

John H. Robinson, executive vice president, Wheeling Corrugating Co., Wheeling, W. Va., died Feb. 13. Mr. Robinson served for many years as manager of the company's St. Louis warehouse, and for the past 16 years had been located at Wheeling.

—o—

Robert L. Gordon, 71, vice president and director, Pullman-Standard Car Mfg. Co., whose office was in New York, died Feb. 12 in St. Petersburg, Fla. Mr. Gordon became vice president in 1917.

—o—

S. C. Vessy, 80, president, W. W. Sly Mfg. Co., Cleveland, died Feb. 14 in that city. An attorney by training, he had been president of the company since 1920. Mr. Vessy was a past president of the Foundry Equipment Manufacturers' Association and a past director of the American Foundrymen's Association.

—o—

Oscar Goldfein, 48, one of the founders and a partner, Western Metal Co., Chicago, died Feb. 16 in that city after a long illness. He had been associated with the nonferrous metal smelting trade more than 25 years.

—o—

Joseph B. Pray, 55, purchasing agent, Otis Elevator Co., New York, died Feb. 16 in that city.

Clarence M. Bischoff, 55, economy supervisor, American Brass Co. at Kenosha, Wis., died Feb. 8 in that city. Mr. Bischoff had been affiliated with the American Brass Co. for the past 30 years.

—o—

Harry W. Geiger, head of the coal forwarding department, Pickands, Mather & Co., Cleveland, died Feb. 14 in that city.

—o—

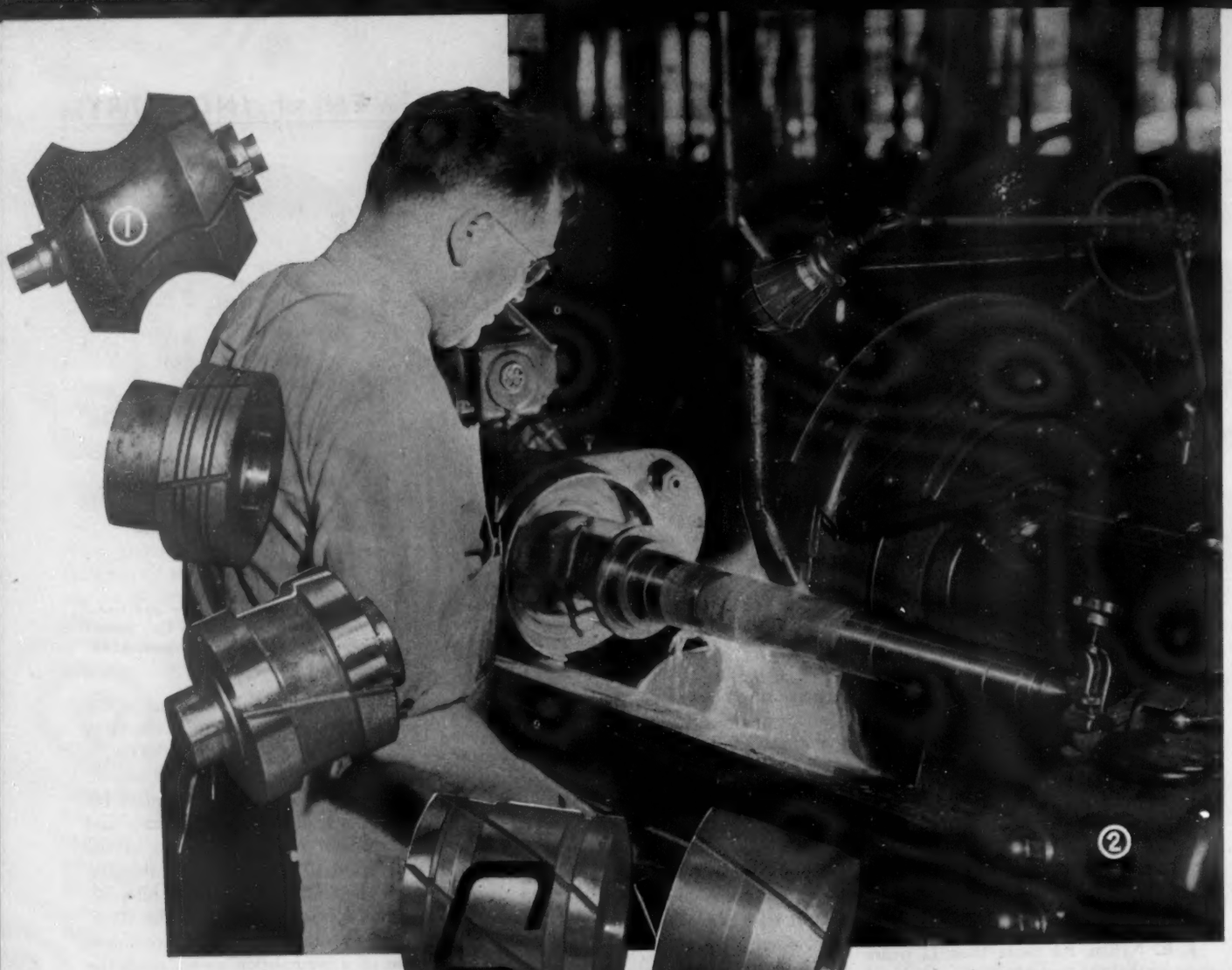
Samuel Miller, 48, operator of the M. & M. Iron & Metal Co., Cincinnati, died recently in that city.

—o—

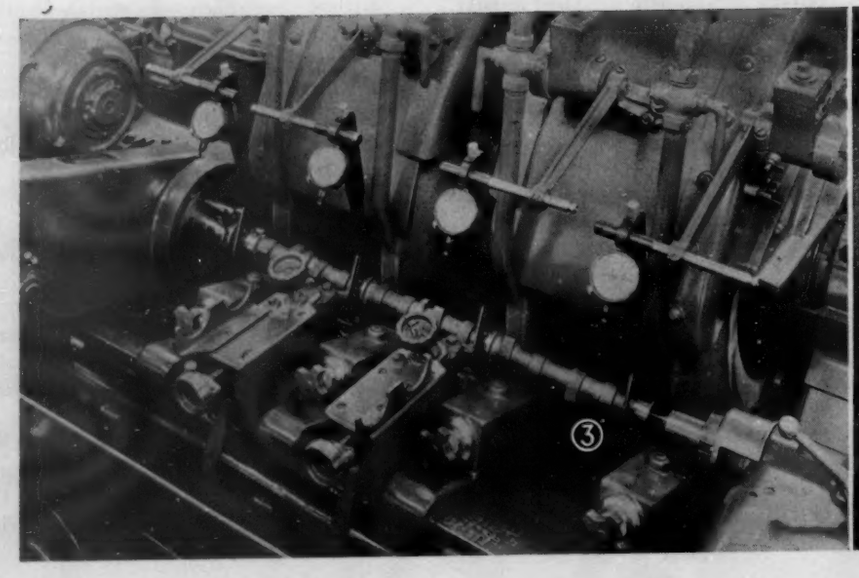
Richard Reininger, 79, retired general manager of the Newark Rivet Works, Newark, N. J., died recently in Miami Beach, Fla.

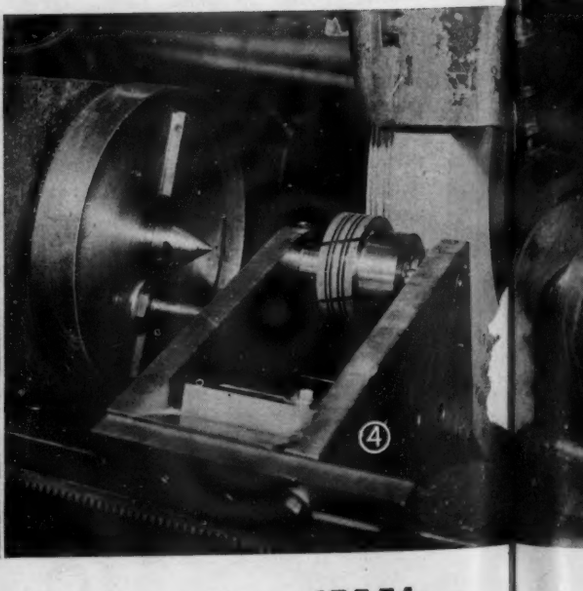
—o—

Warren W. Hartzell, 49, superintendent of rolling mill at Lowellville, O., Sharon Steel Corp., died recently at his home in Youngstown.



SMART TOOL





Today the abrasive wheel is one of the most important of all metal cutting tools, and one of the most versatile. Not only is it depended upon to bring work to close tolerances as far as size is concerned and to produce fine surface finishes, but at the same time it is depended upon to remove considerable amounts of metal. In this article, Mr. Johnson reveals a number of ways in which ingenuity in tool engineering contributes heavily toward efficiency in grinding operations

ENGINEERING Speeds up production grinding

By W. G. JOHNSON
Grinding Machine Division,
Norton Co.,
Worcester, Mass.

THE old greeting, "What's new?" is often applied in discussions on grinding problems. The following comments present a brief examination of developments and trends on present types of grinding problems.

For reasons of economy, process engineers are becoming considerably interested in the possibilities of using several wheels on a single wheel sleeve for the purpose of grinding separate diameters at one time. This arrangement is oftentimes practical, as in the setup depicted by Fig. 5. In considering the possibilities it is well to bear in mind that the accuracies obtained on sizes are definitely determined by the difference in diameters on the grinding wheels as trued in them, and the ability of these wheels to retain this accuracy. This means that in making combination cuts it is always well to match open tolerance diameters with only one close tolerance diameter.

In addition it is well to refrain from combining interrupted surface types of grinds (such as splined surfaces) with any surfaces requiring bearing finishes or accuracies.

It is undesirable to contemplate multiple wheel assemblies of the character shown in Fig. 5, where the wheel spacing and diameter differences prohibit the use of a standard diamond nib while truing. The span between wheels should not be any greater than will provide a practical capacity of the grinding machine wheel spindle design to support such an overhang condition.

Where grinding cuts are so far apart as to make it impractical to mount the wheels on one sleeve, or in cases where individual control of diameter is desired, it may be entirely practical to make the application in the form of two individual wheelslides each independently operated and controlled.

Single wheel application on each of the two slides makes it possible to have inde-

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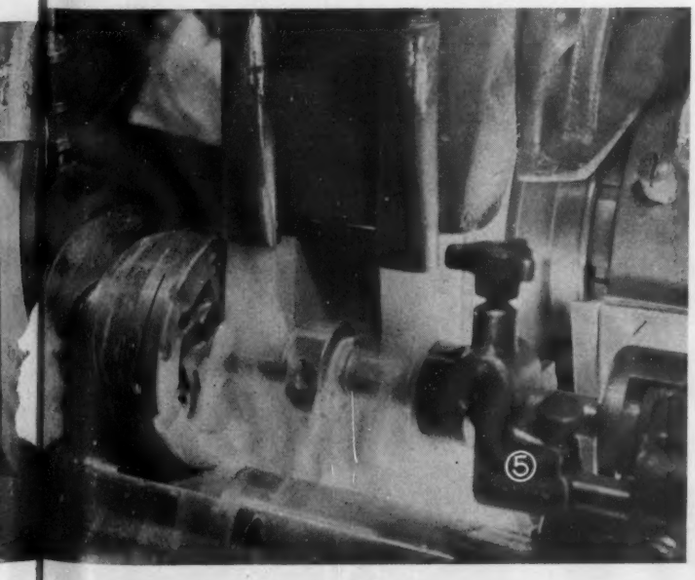


Fig. 1—Here are five examples of the many shapes of rolls now in successful use in crush dressing of abrasive wheels for plunge cut form grinding

Fig. 2—An adequate supply of properly selected coolant—rightly applied—is one of the keys to success in modern production grinding

Fig. 3—On this cam shaft job dual grinding heads, each equipped with twin wheels, are employed. Slender work of this nature requires support other than that given by driving chuck and tailstock center

Fig. 4—In this photograph, one of the crush forming rolls shown in Fig. 3 (the second from the left) is gradually being forced into the periphery of the slowly rotating abrasive wheel. The shape thus impressed into the wheel will in turn be reproduced accurately in the work

Fig. 5—Twin wheel grinding, the two wheels being mounted on one head so as to operate on areas separated by a collar

STEEL

By L. E. BROWNE
Associate Editor, STEEL

Fig. 1—Braided pad of steel wool with strands running in all directions. It is used extensively in floor maintenance. (American Steel Wool Mfg. Co. photo)

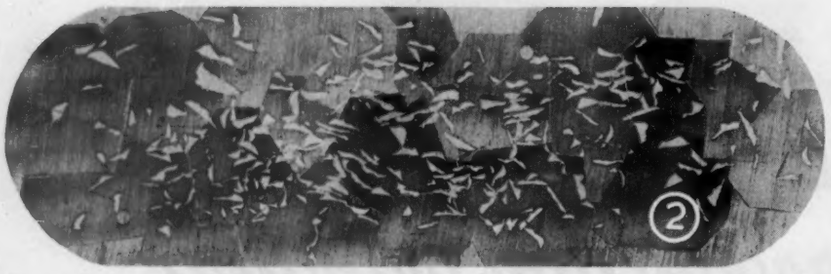
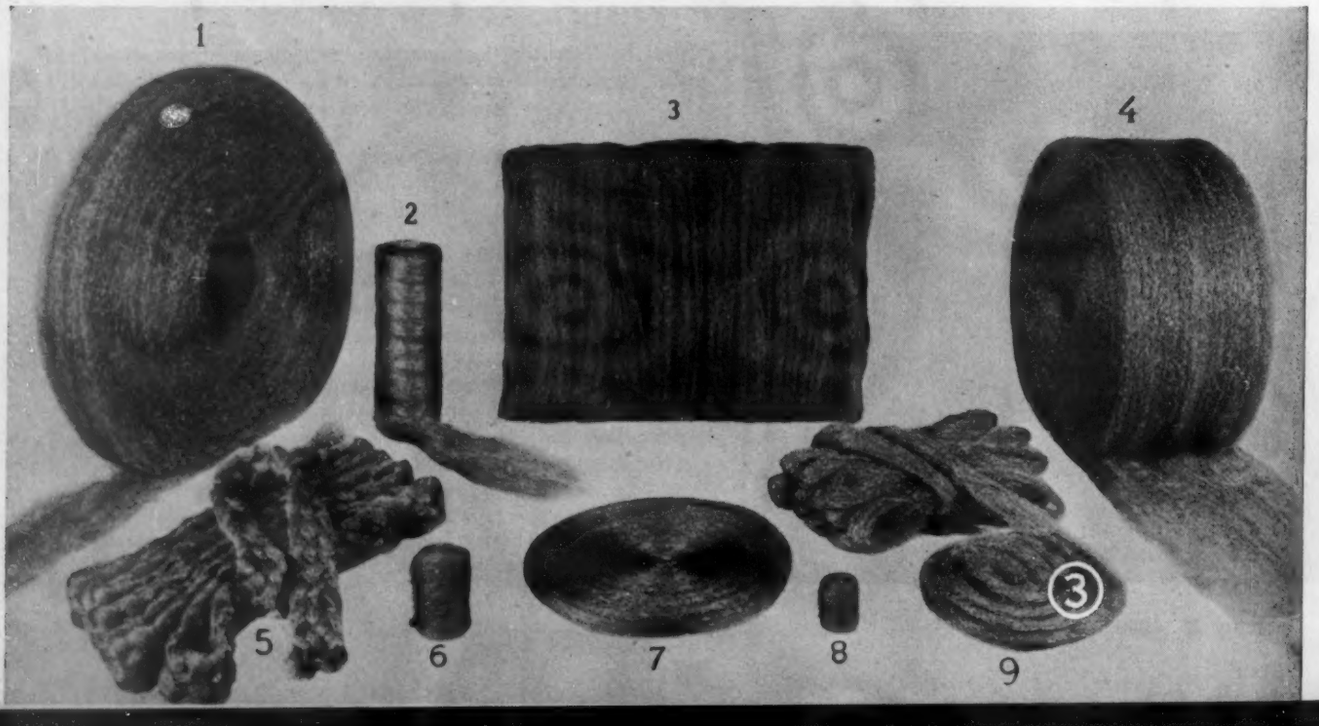


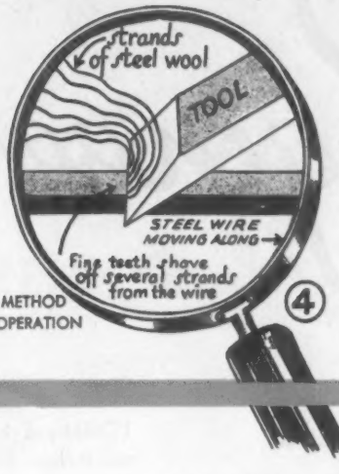
Fig. 2—Cross section of steel wool in binder. White figures are steel fibers at magnification of 25 diameters

Fig. 3—Steel wool in various forms for use in industrial and household applications. All exhibits are shaped by automatic machinery

Fig. 4—Diagram of a method of operation showing critical point at which teeth of cutting tool meet wire



Wool



—Characteristics of Materials and Manufacture

IN cutting or shaving steel wool from wire, the chip, or fiber, is the finished product. It is not scrap. This is contrary to conventional machining operations in that what remains in the machine becomes waste material, amounting to about 20 per cent of steel consumed. Close to 12,500 tons of steel wire are required by this industry annually.

In production, the ultimate to be achieved is a long, uniform, silky, resilient steel fiber cut or shaved at relatively high speeds from coils of round wire by several types of specially designed machines. Cutting is either vertical or horizontal and machines operate automatically.

Steel wire to meet mechanical and physical characteristics in production and finished material is closely controlled from blast furnace. Uniformity in dimension of individual chips, and strength or toughness—as distinguished from brittleness and shortness in fibers which make up a band, pad or ribbon of steel wool—are paramount considerations. Machine shops producing turnings or borings dispose of them as scrap. But for steel wool, chips are cut to definite specification for size, grade, strength and length. Maximum fiber length is sought and individual fibers over 100,000 ft long are possible in coarser grades.

Characteristics of wire for this commodity must be considered. Machinability is important, but in providing this, physical properties desired in the chip must not be impaired. Sulphur content in usual machining steels is, of course, elementary in many specifications, but the chip from high sulphur steels is brittle and limited in length, undesirable for steel wool. Thus, the usual mill practices for obtaining machinability are not applicable. A reasonable degree of free-machining quality must be provided in the steel for a clean cut; otherwise the resultant chip or fiber will be irregular, rough or non-uniform. There were numerous disappointments in early developments to obtain wire for efficient shaving into wool.

Acid bessemer wire is widely used for its desirable qualities. Average analysis is 0.12 per cent carbon, 0.90 manganese, 0.10 maximum phosphorus, with low sulphur of about 0.04 maximum. Uniformity being a special requirement for a high quality product, this objective begins to

The chip, or fiber, cut or shaved from wire in making steel wool is not scrap but the finished product. Essential uniformity is accomplished by upholding quality from primary steel melt on down through manufacture

be met in primary steel melt and quality control starts at the blast furnace.

After hot-rolling steel into 7/32-in. rods, additional qualities adapting it for use as steel wool are built into the wire. Patenting puts hot-rolled rods into a more uniform condition and provides a preparatory heat treatment to improve the capacity of steel for cold working, the latter being necessary for several reasons.

Inasmuch as about 0.01-in. diameter stock—the size used for a substantial part of production—is too small for hot rolling, wire is reduced by cold drawing with greater percentages of reduction than in conventional wire mill practice, either on individual blocks or continuous wire-drawing-equipment, with several dies in tandem. Reduction by cold drawing also results in elongation of crystals or grain structure lying parallel with the axis of the rod. In hot-rolled rods, grain crystals are approximately equiaxed. An elongated crystal grain, even to an extreme degree, is desirable. Steel inherently of a grade to stand this degree of cold working is required.

Patenting enhances this capacity for cold reduction, but the steel itself must possess the capacity to a great extent. In cold-drawing operations, design of dies and stages of reduction must be such as to prevent injuring the steel by generating incipient ruptures which, although microscopic, might mean points of weakness in wool chips or fibers.

While average manganese content of wire is 0.90 per cent, improved fiber quality sometimes is found in grades of wire with a manganese range of as much as 1.5 per cent. Manganese is considered to have a hardening, rather

(*Please turn to Page* 124)

Engineering NEWS

New Casting Material

A combined ceramic and thermoplastic material called Plastiform, developed by Duorite Plastic Industries, Culver City, Calif., is said to produce finished castings in only 5 min. It is prepared for casting by melting in a double boiler whose outer container holds an oil bath to prevent overheating. After it attains a temperature of more than 240° F, the material becomes a fluid which can be poured, brushed, sprayed, or dipped. Molds of almost any type can be used to give it a suitable form, and it has been used in making tools for aircraft work, protective coverings, insulators, and office equipment. Also, the material can be reclaimed by melting.

For Quality Control

A new technical committee has been organized by the American Society for Testing Materials on Quality Control of Materials. The committee is headed temporarily by H. F. Dodge, Bell Telephone Laboratories, Inc., New York. On Tuesday evening, February 26, a quality control session will be held in connection with the spring meeting of ASTM at Hotel William Penn in Pittsburgh. A number of authorities in the field will present papers.

Nazi Transport Display

Captured German transportation equipment held at Fort Monroe, Va., by the Army will be available for inspection by engineers, scientists and manufacturers for the three days, March 6-8, inclusive. Exhibit, prepared by the Army's Transportation Corps Board, will include German diesel engines ranging from 45 to 2500 hp; the latest type steam and diesel locomotives; railroad cars; a 17,000-gal tank car; a 135-ft diesel rudderless minesweeper with vertical type propellers (first craft of its type to cross the Atlantic under its own power); and other German transportation equipment incorporating unusual technical features. Office of the Publication Board, Department of Commerce, will distribute to the public reports and charts on the equipment.

Rubber "Heart" for Valve

Stretched over a slotted cup-shaped metal core, a synthetic rubber tube which expands to open and contracts to close is the "heart" of a new valve for handling even the most highly corrosive and erosive air, gases or liquids.

Due to the fact this expansible tube closes instantly on balanced flow, prior to the commencement of back flow, there is no tendency to establish pressure impulses, shock or water hammer through the flow line. According to Grove Regulator Co., Oakland, Calif., the maker, the unit possesses a uniform and constant spring rate which avoids conditions that would result in operation beyond the flow requirements.

Carbide Milling

In an address before the Toronto Chapter of the American Society of Tool Engineers, Howard Pope of the Cincinnati Milling Machine Co., Cincinnati, described the many advantages of high-speed carbide milling, including increased production, longer tool life, improved finishes—and most important—lower cost per piece. He said that the carbides do not and probably will not completely replace high-speed steel for milling cutters as there are advantages to be derived from the use of high-speed steel tools in certain instances.

As carbide tools are very sensitive to variations in cutting speed, the use of a flywheel was urged to insure even speed. This flywheel should be mounted on an arbor as close to the work as possible, and it should be keyed to the arbor so there is no looseness.

Precision Nickel Castings

As the forerunner of production on a commercial scale, a pilot plant at the Bayonne Works of the International Nickel Co., New York, has been producing a wide variety of precision castings in nickel and nickel alloys. Capacity of the pilot plant is limited to 500 pieces a week. Plant for large-scale production already has been started at Bayonne and is scheduled for operation early this year.

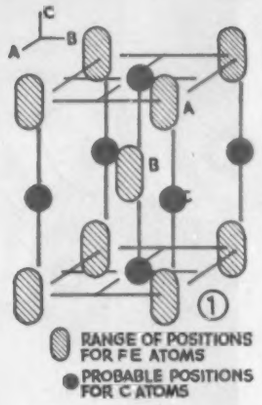
Mighty Conveyor

Replacing a previous installation in which three belts in series had been used, a single cord conveyor belt installed in a Minnesota ore mine has handled an hourly average of 900 long tons of ore, a total of more than 2,250,000 tons during the 1945 season, according to B. F. Goodrich Co., Akron, makers of the belt. This is an average of 30 more tons daily than had been previously handled by the three-belt system.

The belt is 30-in., 8-ply, 1556 ft center-to-center, from the head pulley shaft to tail pulley shaft, with an overall lift of 149 ft. It runs 550 fpm, and was made endless on the job. Design of the drive is unique, the head pulley being driven by two 100 hp motors on each side of the shaft and the secondary pulley by one 100 hp motor. Both pulleys drive the belt from the bottom or clean side cover of the belt, and this, coupled with herringbone lagging has given slip-proof operation.

Atomic structure OF STEELS

Method of x-ray analysis is peculiarly suited for determination of atomic structures of different phases present in steels



UNTIL recently, steel producers had to be satisfied with purely empirical relationships between composition and heat-treatment on the one hand and mechanical and physical properties on the other. Knowledge about steels could only be gained by experience, and it was a matter of guess-work to predict what type of steel would be produced by an untried combination of carbon-content and heat-treatment.

It is the scientific ideal to be able to make this prediction with certainty from a complete knowledge of the changes which take place within the steels and how and why these will affect the properties. We are still a very long way from attaining this ideal, but the first stage, that of determining the different atomic arrangements and when and how they change over into one another, has been quite well covered.

In the determination of the atomic structures of the different phases present in steels, the method of x-ray analysis is peculiarly suited. Other methods of investigation, such as thermal and microscopic analysis, can tell us of the occurrence of phase changes or the number and distribution of the phases in a particular specimen, but only x-rays can tell us how the atoms build up each phase. The method of x-ray analysis commonly used for the investigation of metallic compounds is the powder method of Debye and Scherrer[1].

The specimen is a powder in the form of a thin rod, and is placed on the axis of a cylindrical camera, around the outside of which a narrow strip of film is wrapped. A beam of

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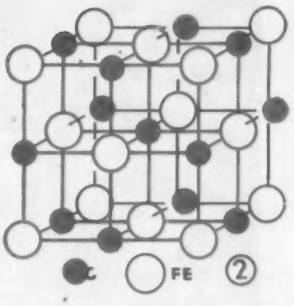
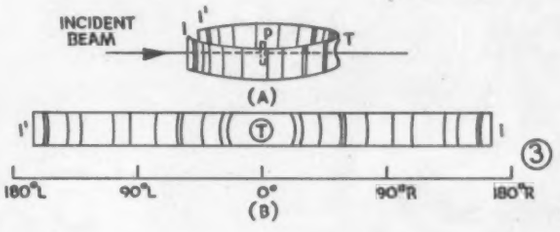
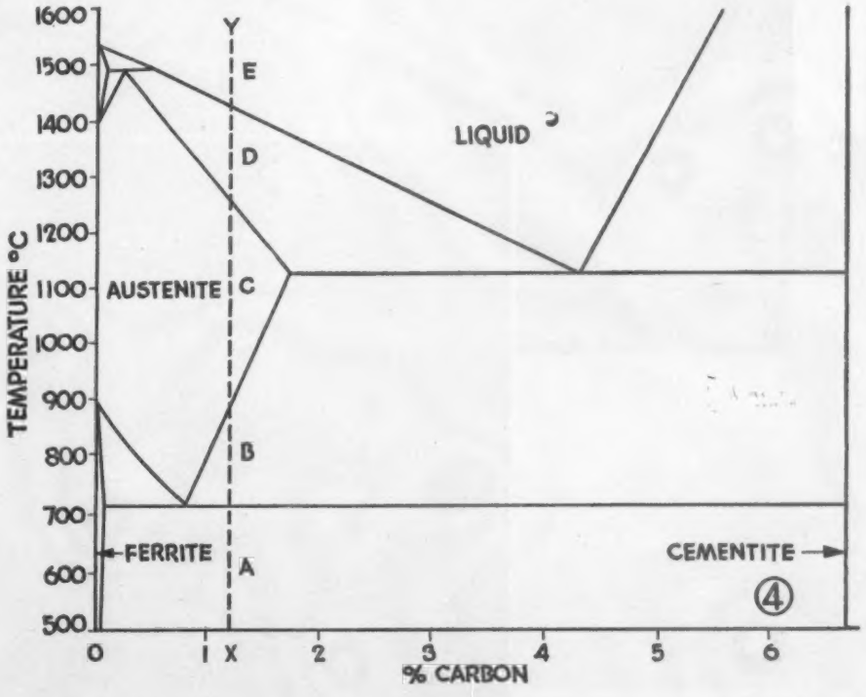


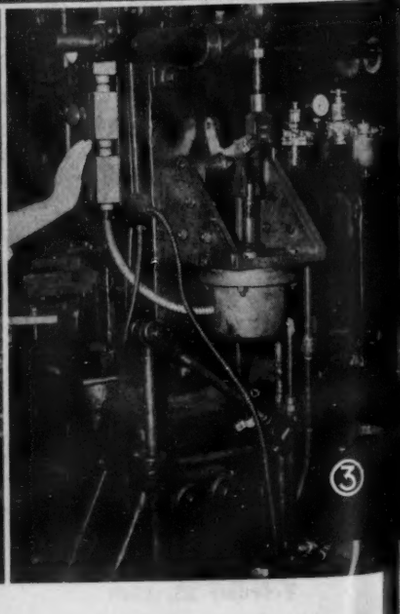




By AUDREY M. B. PARKER
Cavendish Laboratory
Cambridge University
Cambridge, England

Compressed Air

AIDS AUTOMOTIVE PARTS P



PRODUCTION...

COMPRESSED AIR supplies the large quantity of power necessary to shape steel into frames for heavy trucks, jeeps and other automotive parts at Midland Steel Products Co., Cleveland. Along the rows of huge punch presses, in the welding department and in the machine shop there are numerous operations which are better performed because compressed air has been applied to the job.

Below the factory floor line and out of sight from the working area is the view in Fig. 2 of the compressed air cushion for a punch press, but the fact that it is not visible makes its contribution to production no less noteworthy. The steel blank is held in position by air pressure while the forming takes place. When new work is set up in the press, the pressure regulator is simply changed according to the work to be done. This method is faster than for the adjustment required to set pressure by turning screws on a toggle action press.

Above the floor level, compressed air is employed on the large presses, some of which have capacities of 2800 tons. Formerly, operators had to exert considerable physical effort to engage and then disengage the clutch on the heavy machines by hand lever; compressed air now supplies the power for this action. By pushing a button (Fig. 3) a solenoid valve is actuated, and air enters into a cylinder which engages the clutch, at the same time applying the brake. On presses which have up to four operators, each man has to press the button at his station before the device goes into action.

Steel sections which have been formed in the presses are joined as shown in Fig. 5. Here a fixture is used to clamp a frame to exact size and shape for welding. As the frame is placed in position, the welders apply air pressure to a series of clamps which quickly draw the parts of the assembly in and down, squarely in place for arc welding. Another welding fixture is shown in Fig. 4. On this automatic arc welding process for joining a ring to a plate, the air cylinder seen at the left in picture raises and lowers the welding head and the one at the right is for clamping work in the fixture. Air clamps and vises such as these are generally used throughout the plant. They save production time, provide exact positioning and by their positive action hold the exact position during work.

An air clamp used in the machine shop in connection with the hydraulic test of slave cylinders is shown in Fig. 1. Each cylinder is submitted to hydraulic pressures of 2000 lb to test for leaks. The operator is able to run these tests rapidly, as he can instantly clamp and unclamp the pieces at a flick of the air lever. Typical on many air clamping devices used in the plant is the toggle link which may be seen in the picture. It is worked into the fixture so that it will lock in place as the clamp closes on the piece. By this arrangement the clamp can hold extremely heavy loads at a minimum exertion of air pressure. Air vises used in the machine shop also employ this

(*Please turn to Page* 138)

Fig. 1—Air vise for high pressure test: Valves submitted to a 2000 lb hydraulic test are quickly clamped into position and then released by air pressure. Note the toggle length at the center of the testing device

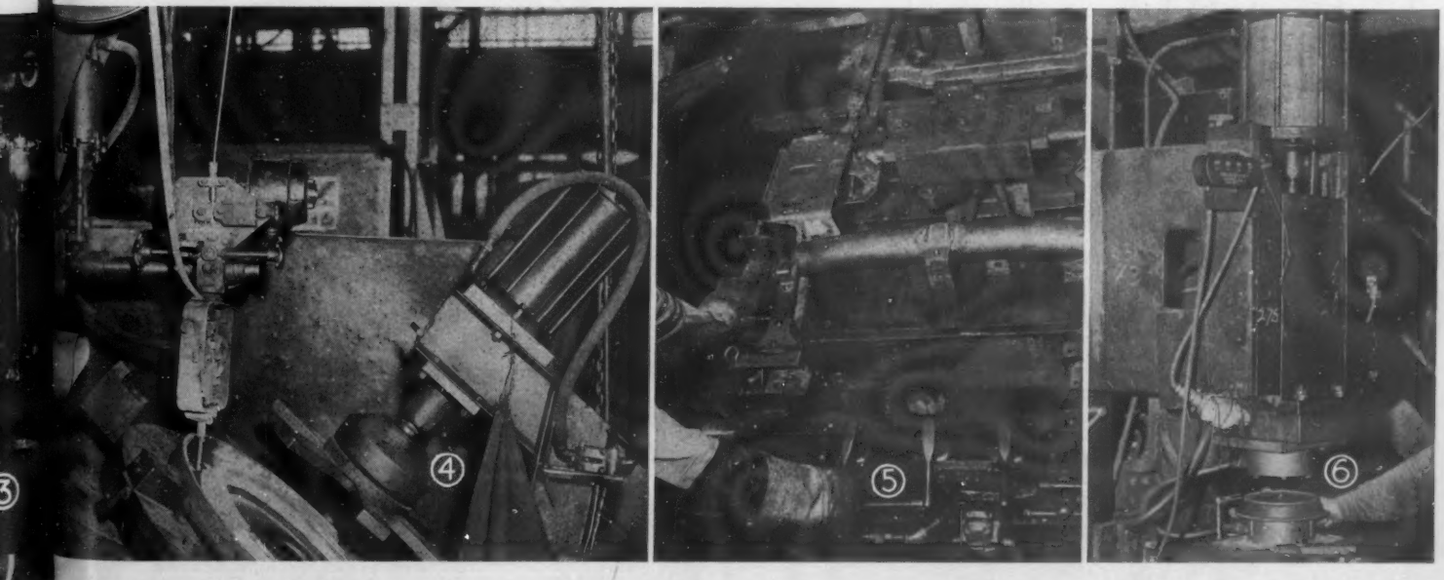
Fig. 2—Part of the cushions for a 2800 ton punch, some of the air pistons below a punch press are seen here

Fig. 3—Push-button operation to engage and disengage press clutch. Air (lower right) is released by solenoid valve in control box (next to air reserve tank) and causes cylinder (center of picture) to engage clutch. A complete revolution by press reverses the process

Fig. 4—On this automatic arc welder, compressed air raises and lowers the welding head (note air cylinder at left) while work is clamped by larger air cylinder

Fig. 5—A jeep frame is placed in this fixture for arc welding of parts. Clamps powered by compressed air are along the sides and at the ends to easily draw the parts to the exact frame size, then they are welded. Welder at other end of frame also has set of air controls

Fig. 6—On this projection welding process, pressure from the air cylinder which holds the work in place is applied and released by the welding timer



Applications of Eberbach

MICROHARDNESS

Comparatively new apparatus employs a diamond penetrator so mounted that extremely light loads can be applied and small impressions made. Method is based upon microscopic measurement of plastic deformation. Treatise submitted by author as a thesis for the degree of master of science at the University of Wisconsin

HARDNESS has an extremely vague meaning and may be used to define a number of different material properties. The terms indentation hardness, cutting hardness, and abrasive hardness may all be used but each covers distinct characteristics. There is still no concept of hardness as a simple property, nor is there a precise definition. Until hardness can be defined, it cannot be confidently measured, though recourse is had through arbitrary tests and the determination of hardness numbers. Possibly the point that confuses the issue is the necessity of altering the metal during the test and thus changing the very properties whose measurement is sought. Hoyt[1] illustrated that when mention is made of the hardness of copper what really is meant is not hardness but a certain amount of indentation. Is it necessary to know the true hardness unaffected by indentation hardening effects?

Technical practice is not concerned with the niceties of the mechanics of hardness testing so long as a handy tool is provided which works. In this field we may assume that hardness is simply resistance to indentation on some fixed scale. It is sufficient to know that the metal when processed in a certain way either does or does not have the required hardness number. Hence, the theoretical features which exclude the test from being the true measure of hardness play no part in the application of the test in technical practice when properly done.

Hardness testing by brinell, rockwell, and vickers methods affects a large number of crystals. This means that not only the crystalline plastic deformation, but also distribution, magnitude, and number of the crystals influence the results. Until now, microscopic hardness measurements have not been adopted, apart from the examination of scratch hardness and abrasive. The last two methods, however, measure rather the resistance to wear than the plastic deformation. This Eberbach microhardness method

(1) All references are presented at end of article.

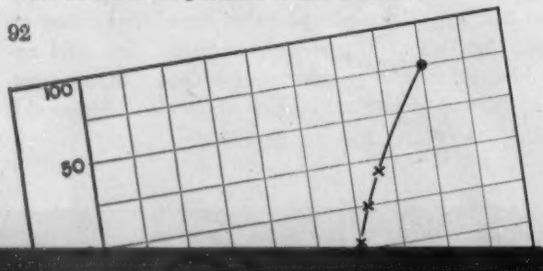
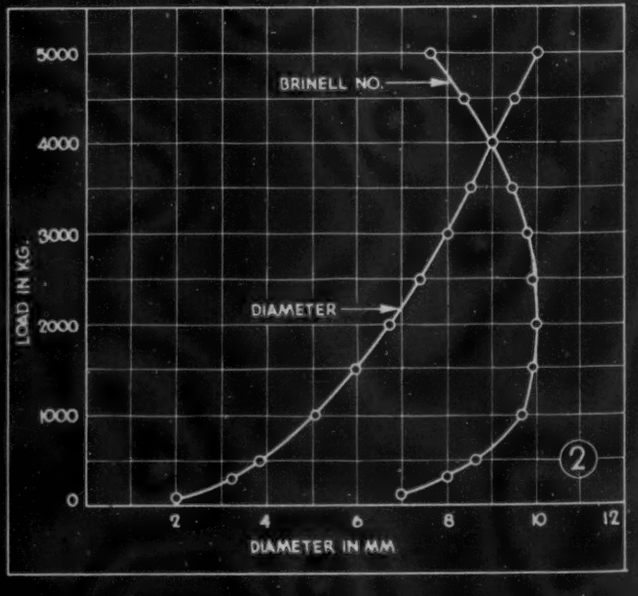


Fig. 1—Vickers hardness number vs. load applied to indentor on sample of Armco iron

Fig. 2—Tests made by Hoyt on annealed copper by a ball indenter



By HOWARD E. BERNHARDT

TESTER

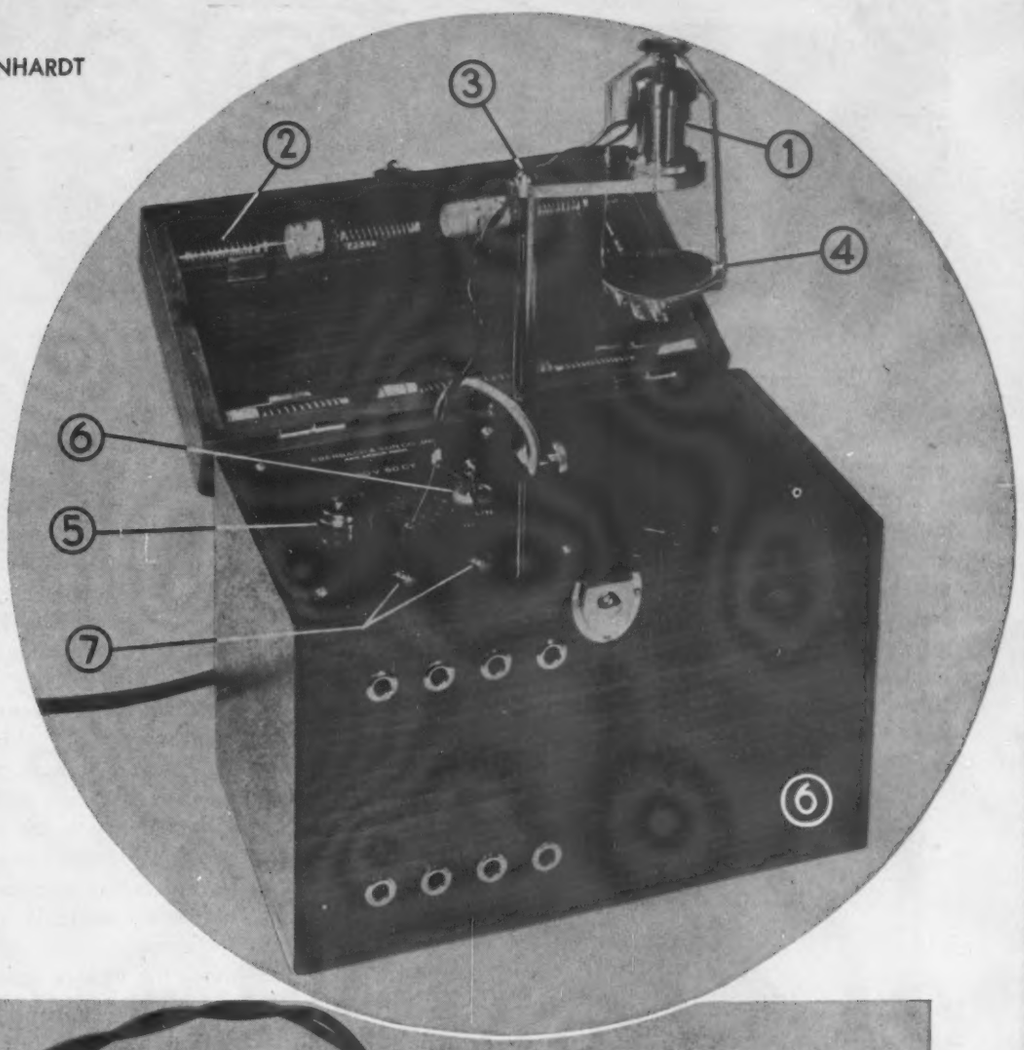
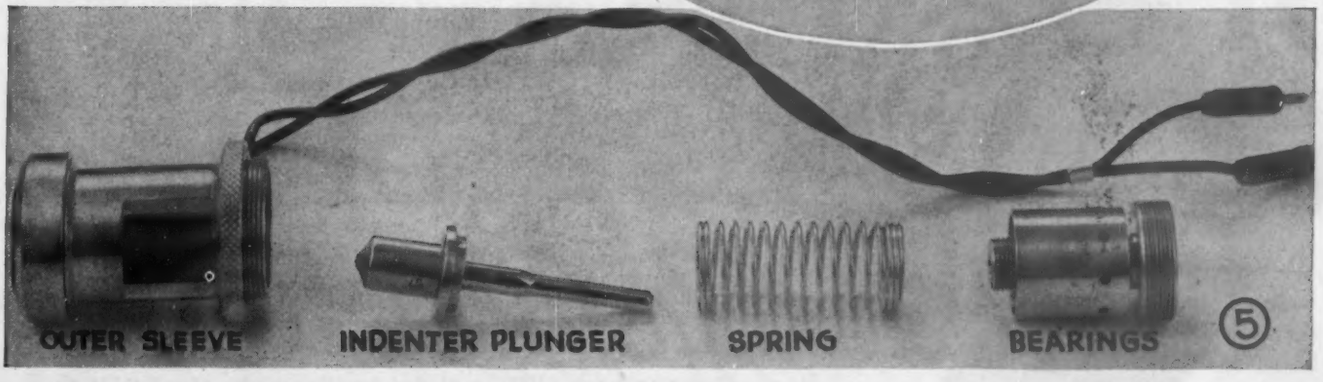


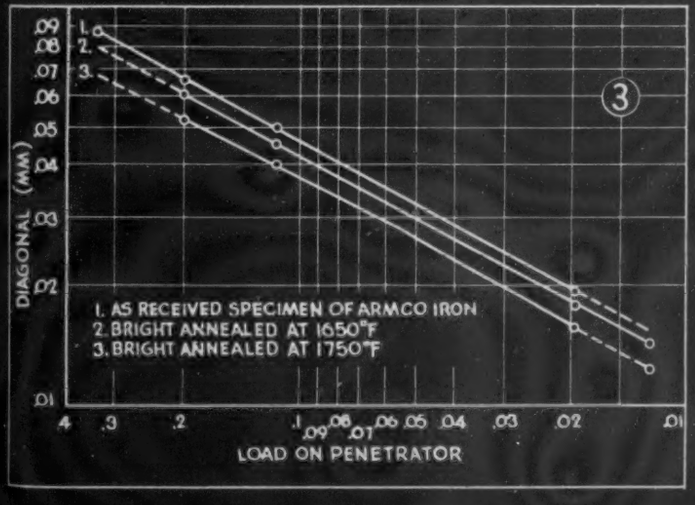
Fig. 3—Microhardness measurements on Armco iron showing that data conforms to Meyer's formula

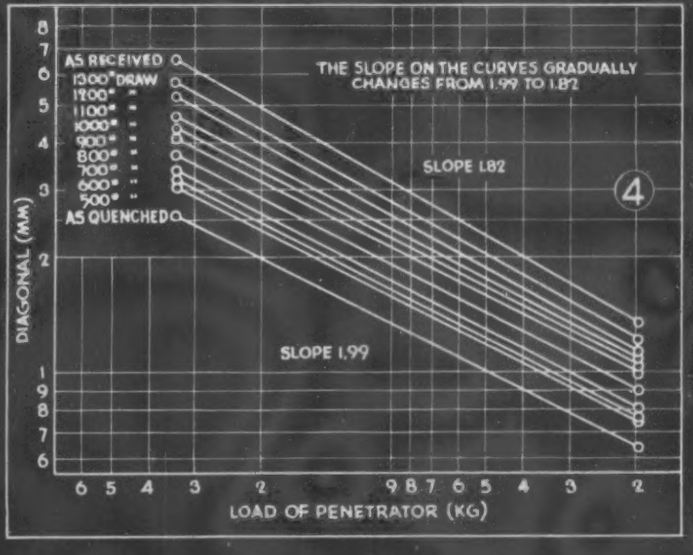
Fig. 4—Microhardness measurements on 0.90% carbon steel showing that data conforms to Meyer's formula

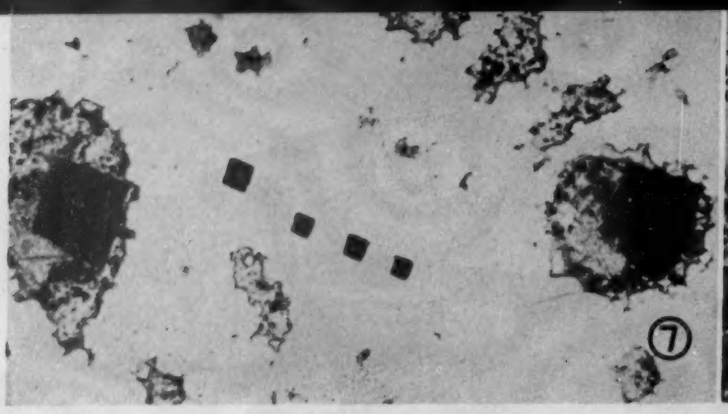
Fig. 5—Indented unit disassembled showing outer sleeve, indenter plunger, coil spring and bearings

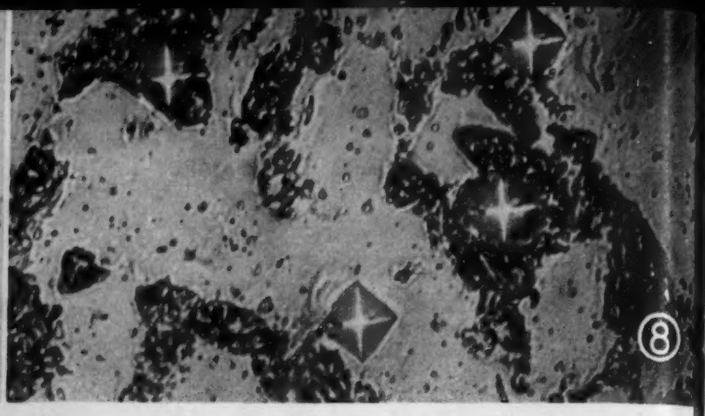
Fig. 6 — Eberbach microhardness tester showing assembly to calibrate indenter unit. (1) Indenter unit, (2) spring, (3) indenter unit support, (4) scale pan, (5) pilot light, (6) switch, and (7) phone plug terminals











is based upon the microscopic measurement of plastic deformation. The results are expressed in the same units as the standard hardness numbers, and hence are comparable within certain limitations.

Description of Instrument: The unit essentially consists of a diamond penetrator (like that used in the well-known vickers hardness tester) mounted so that it can be attached to a microscope in place of the objective lens. Indentations in the specimen are made by a precisely ground diamond mounted on the tip of a plunger. The hardened and ground plunger slides in contact with two hardened and carefully lapped bearings. The force necessary to force the diamond penetrator into the grain of metal is furnished by a carefully calibrated spring. In operation, the diamond is raised and the force soon becomes sufficient to overcome the influence of this calibrated spring and opens two closed contacts, thereby illuminating a small lamp. When this occurs, it signifies that the force opposing the penetration of the diamond has just exceeded that exerted by the spring. This insures that the same loading or force on the diamond is used in a number of separate trails (or as long as the same spring is used). Of course, springs exerting different forces can be used for the same reason that various loads are used with the standard rockwell machines.

The diamond penetrator is accurately ground to a square pyramid shape. The point of the diamond ground to 136° included angle between opposite facets is sufficiently accurate to make nearly perfect impressions at 1000X. When an indentation is made with this type of penetrator, the diagonals of the recess can be measured by using a microscope with a filar micrometer eye piece. The resulting microhardness number is computed in the same manner as with the conventional vickers machine[2]. The numerical value of the vickers hardness number is equal to the applied load, divided by the area of the pyramidic impression:

$$\text{Diamond pyramid hardness} = P/A$$

where, P is the load on the penetrator in kilograms, and A is the lateral area of pyramidal impression. The lateral area A of the pyramidal impression is equal to the perim-

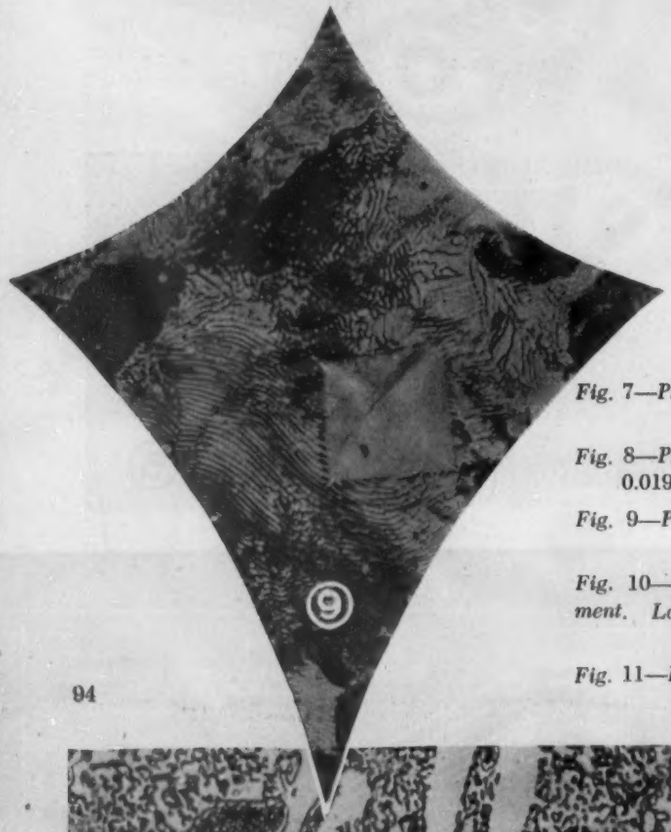


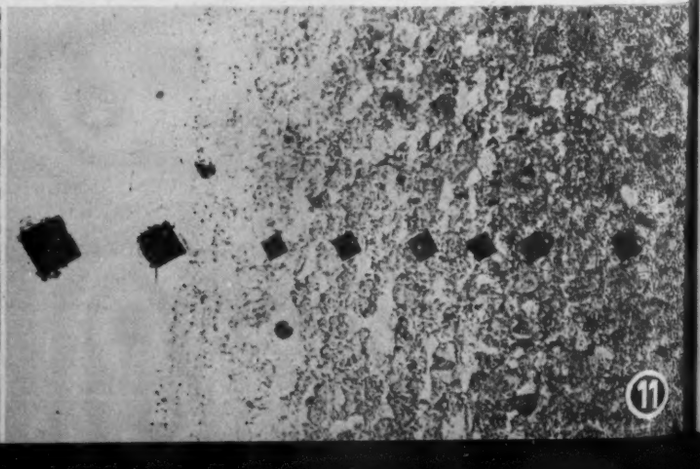
Fig. 7—*Photomicrograph* (200X) *of unetched lead bronze bearing alloy. Load* 0.0195-*kg, microhardness* 169 *to* 130 *Vickers*

Fig. 8—*Photomicrograph* (1000X) *of heat-resistant chrome-nickel alloy. Load* 0.0195-*kg, microhardness of austenite* 282 *and of sigma phase* 452

Fig. 9—*Photomicrograph* (1000X) *of fine lamellar pearlite. Load* 0.116-*kg, microhardness* 338

Fig. 10—*Photomicrograph* (1000X) *of Stellite No.* 93 *after solution treatment. Load* 0.0195-*kg; microhardness of carbides* 1240, *of eutectic mixture* 735, *and of secondary carbide phase* 863.

Fig. 11—*Photomicrograph* (250X) *of stainless steel, Type* 410. *Load* 0.116-*kg, microhardness of nitrided case ranges from* 168 *to* 866



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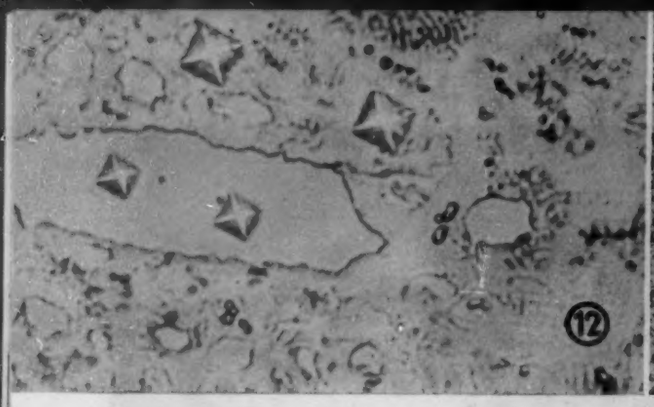
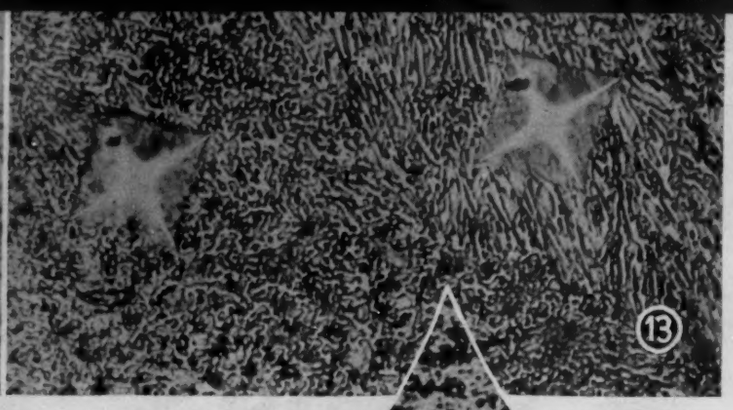




eter of the square surface ($4a$) impression multiplied by one-half the slant height S.

$$A = 2\,aS$$

and the diagonal square equals $2a^2$. Therefore,

$$A = 2\,D/2 \times S$$

The angle between opposite faces of the pyramid and, therefore, the corresponding angle of impression is 135 degrees. The slant height, S, may be expressed as:

$$S = \frac{a/2}{\sin \theta/2} = \frac{D/2\sqrt{2}}{\sin \theta/2}$$

Substituting this value of S, the total lateral area of the impression is as follows:

$$A = \frac{D^2}{2 \sin \theta/2}$$

Substituting this value of A in the first equation, the final vickers hardness equation is:

$$MH = \frac{2P \sin \theta/2}{D^2}$$

where,

MH is the microhardness number.

P is the load applied in kilograms.

θ is the angle of the diamond penetrator.

D is the average length of the diagonal in millimeters

If the plane of the polished specimen is not exactly horizontal, the impression will be "kite shaped." In such a case, it has been found better to use the shorter diagonal when computing the microhardness number.

In operation of the microhardness tester, it is also advisable to use as large an indenting force as possible, thereby obtaining a large and easily measured recess in the sample. Of course, the size of the phase constituents under consideration limits the load that can be applied.

Preliminary Test Results: On a specimen of Armco iron the wide discrepancies of hardness values when tested with different loads and calculated by the standard vickers formula are clearly evidenced. Armco iron was chosen because of its low carbon completely ferritic structure. Table

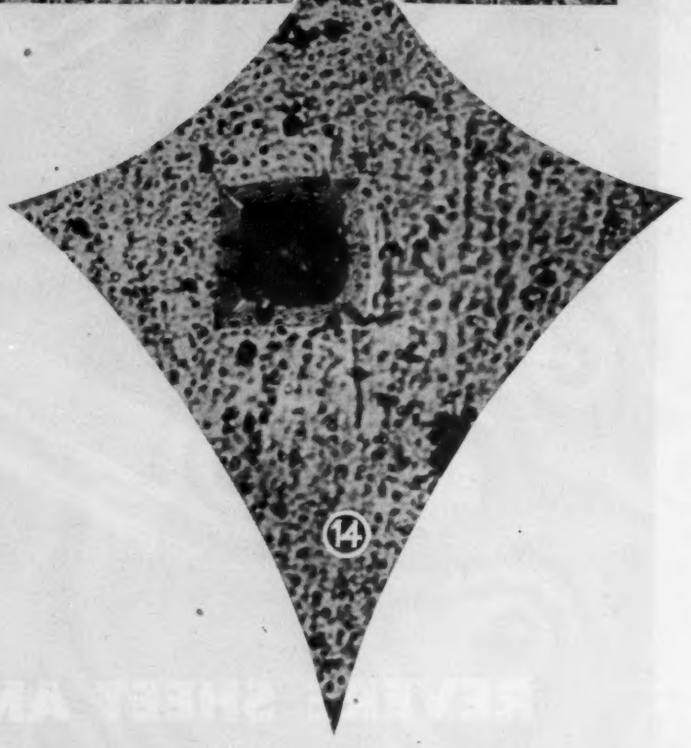


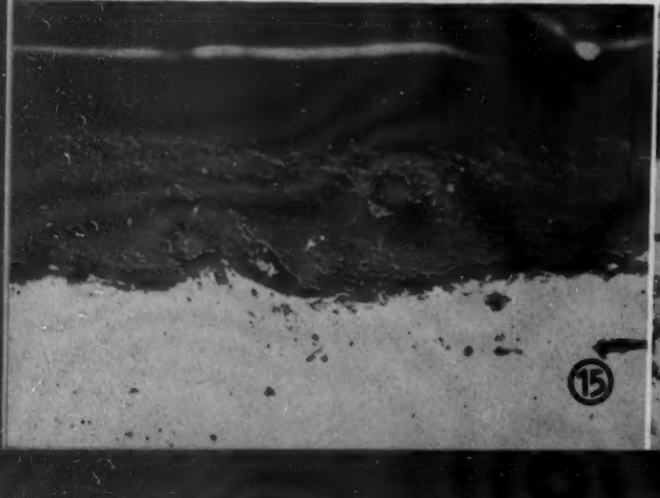
Fig. 12—*Photomicrograph* (1500X) *of Stellite No.* 1 *as cast. Load* 0.0195-*kg, microhardness of carbides* 1610 *and of eutectic background* 905

Fig. 13—*Photomicrograph* (1000X) *of Stellite No.* 1 *after solution treatment and slow cooling. Load* 0.200-*kg, microhardness* 760

Fig. 14—*Photomicrograph* (1000X) *of high-manganese steel. Load* 0.116-*kg, microhardness* 240

Fig. 15—*Photomicrograph* (250X) *of phenol-resin plastic sprayed on carbon steel. Load* 0.0195-*kg, microhardness* 52

Fig. 16—*Photomicrograph* (750X) *of enamel coating. Load* 0.116-*kg, microhardness impressions are* 580, 603 *and* 580



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I shows the variation of the vickers hardness number when the sample was penetrated with various loads. For the microhardness number tests the vickers hardness number was calculated from the standard vickers formula:

$$MH = 1.8544\ P/D^2$$

The three rockwell superficial and rockwell "B" values were converted to vickers hardness numbers by using the Wilson mechanical instrument conversion chart No. 38.

This decrease in microhardness with increasing loads could be attributed to a possible combination of two effects, namely, cold working of the surface layer in grinding and polishing or the natural variation from Kick's law as observed by Hanemann and Bernhardt[3] in microhardness testing. The effect of the latter variation can also be seen in microhardness testing as demonstrated by Hoyt, when testing copper with the brinell machine. Fig. 2 shows the results of some tests made by Hoyt[4] on annealed copper in which the first curve depicts how the diameter of the impression increases as the load on the ball is increased. This curve could be represented by the Meyer's equation $P = a \times D^n$. Similarly, the second curve shows how the brinell number varies with the load applied.

Fig. 1 shows the curve when plotting the data from Fig. 4 using the vickers hardness value vs. the load applied to the sample of Armco iron.

To check the possibility of cold working the surface in grinding and polishing the specimen, two samples of the same material were metallographically polished and etched, and then annealed to remove all traces of cold work. The annealing treatment was accomplished by heating a polished and etched specimen in a completely closed tight fitting cup made from Armco iron. The first specimen was annealed just below the Ac_3 transformation line, at a temperature of 1650° F for one hour at heat and furnace cooled at 200° F per hour. The second specimen was annealed above the Ac_3 line at a temperature of 1750° F for one hour at heat and also furnace cooled at 200° F per hour.

The specimens were, therefore, annealed with an absence of oxygen and left the bright polished surface intact. Without further etching or polishing microhardness readings were then taken on these surfaces with varying loads applied to the penetrator. The opposite side of these specimens was then polished by the usual technique and similar readings were taken. By this method a comparison could be obtained as to the effect on the surface layer from our method of polishing the samples.

Table II shows a tabulation of the data obtained from the foregoing tests. No special precautions were taken when polishing the reverse side of the annealed specimens, consequently traces of cold working were visible under the microscope in certain of the ferritic grains. But, by repolishing and re-etching the surface, nearly all of the visible effects of a cold worked surface layer were removed.

Table II shows that with the usual technique of preparing metallographic specimens only a small amount of cold work might be formed on the surface layer, and this light surface effect can be removed by repolishing and re-etching. The following method of hand polishing, developed for the preparation of microspecimens, will result in specimens which are scratch free and have well retained inclusions.

Rough Polish: Specimen is polished with Nos. 1, 1/0, and 2/0 emery papers in the usual manner, except that on each paper the surface layer removed should be about again as much as necessary to remove the previous scratches. The specimen is then turned 90° and repolished on a worn spot of No. 2/0 paper using light pressure. This added operation expedites polishing on the next operation.

Intermediate Polish: Specimen is now polished on a wax lap using a levigated alumina solution. The time of the entire lapping operation should be about 45 seconds.

Final Polish: This is done on gamal cloth using gamal solution. The recommended concentration of solution is 1 oz of gamal concentrate to 20 oz of distilled water. After the final polish the specimen is deeply etched with 4 per cent Nital solution and then repolished on the gamal cloth to remove the etch.

When plotting the load vs. the diagonal of the impression, the points lie on the curve $P = a\ D^n$. Any work hardening surface effect would be sufficient to displace the lower points from the curve and a straight line logarithmic curve would not have been formed. Fig. 3 shows a logarithmic plot of the load vs. the diagonal for the original Armco iron and for the annealed specimens.

The variation of hardness number with the increasing loads can then be attributed to the work hardening capacity of the metal when indented during the act of hardness penetration. Meyer's and Hoyt's[4] studies have shown that different metals have widely different capacities to work harden and that the exponent, n, in the Meyer's formula will indicate to some measure the nature of this property.

The primary function of a microhardness tester as a laboratory tool must be to record hardnesses of materials or metallographic constituents which are impossible to obtain by standard macro methods and to transfer these values so that they are comparable with other hardness tests. In an attempt to develop useful conversion charts so that, regardless which load was applied, a hardness value comparable with the rockwell superficial could be obtained, a series of specimens prepared from a straight 0.90 carbon steel were tested. Values of the rockwell superficial hardness tester were chosen as the standard hardnesses mainly because its loads are the lightest used in any of the macrohardness testing machines and fairly accurate conversions have already been tabulated so that readings could be readily transferred to any other scale. This is not to be interpreted as meaning that the rockwell superficial is the most accurate of the macrohardness testers. Its choice was made merely because it makes the smallest impression of any of the other standard hardness testers.

A round ½-in bar of straight 0.90 carbon steel was first given a brine quench from 1550° F and then carefully cut into ½-in lengths by a rubber cutoff wheel, while the specimen was submerged in water. Different sections were then drawn at 100° intervals from 500 to

TABLE I

VICKERS HARDNESS NUMBER VS. VARYING LOADS APPLIED TO PENETRATOR

Load, kg.	Vickers hardness No.
0.0126 (Microhardness)	153
0.0195 (Microhardness)	146
0.1160 (Microhardness)	138
0.2000 (Microhardness)	136
15 - T (rockwell superficial)	130
30 - T (rockwell superficial)	128
45 - T (rockwell superficial)	127
100 (rockwell "B")	120

TABLE II

MEASURING EFFECT OF COLD WORK PRODUCED IN PREPARING SPECIMENS

Annealed Surface			Polished Surface*		
Load, kg.	Diagonal, mm.	Microhardness values	Load, kg.	Diagonal mm.	Microhardness values
(1) Annealed at 1650° F					
0.0126	0.0143	115	0.0126	0.0143	115
0.0195	0.0179	112	0.0195	0.0179	112
0.1160	0.0447	108	0.1160	0.0447	108
0.2000	0.0602	102	0.2000	0.0602	102
(2) Annealed at 1750° F					
0.0195	0.0184	106	0.0195	0.0189	101
0.1160	0.0490	90	0.1160	0.0481	93
0.2000	0.0646	89	0.2000	0.0646	89
0.3380	0.0868	84	0.3380	0.0868	84

* Polished by usual technique.

Ground from the solid with one pass of the wheel, in less than 4 min.

This is a typical example of multi-rib wheel performance on tough, heat-treated steel forgings with Jones & Lamson Automatic Thread Grinders.

The 5-pitch, special form API thread, with a taper of 3 inches per foot, and a mean outside diameter of 4.117", is ground in less than 4 minutes cutting time with a three-rib wheel, one rib roughing, one semi-finishing and the third finishing. More than one pound of metal is removed.

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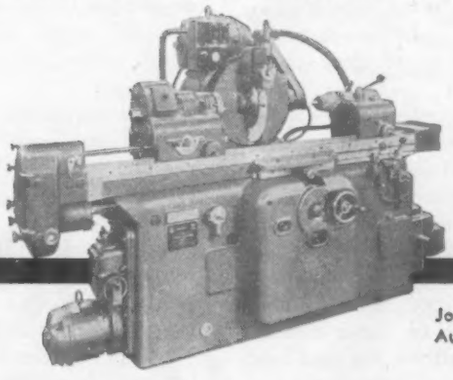

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TABLE III

MICROHARDNESS OF HARDENED AND TEMPERED STEEL (COMPARED TO SUPERFICIAL ROCKWELL)

Specimen	Load on Penetrater (Kg.)				Sperficial	Equivalent
	0.0195	0.116	0.200	0.338	30-N	Vickers No.
As quenched	904	960	928	945	83.5	894
Drawing temp., °F						
500	665	672	676	675	76.0	665
600	622	634	633	629	74.5	626
700	579	569	560	539	71.0	562
800	452	464	460	458	64.0	446
900	382	385	373	384	58.5	383
1000	344	338	330	339	54.5	338
1100	311	311	298	290	51.5	309
1200	296	266	247	235	50.0	285
1300	247	202	193	186	48.5	236
As received	209	165	160	150	72 (30-T)	159

1300° F for a period of 4 hr. These specimens were mounted and polished by the usual technique and a complete hardness survey was made on each section. The 0.0195, 0.116, 0.200, and 0.338-kg springs were used to obtain microhardness numbers, and these were compared to the vickers hardness values converted from rockwell (30-T) superficial scale. Table III shows the variances in hardness when tested with the various loads.

It is observed that there is a close agreement between the microhardness and the equivalent vickers number in all the drawn specimens down to the 1100° F sample. As the hardness is decreased from this point, there is an increasing difference in the microhardness with varying loads.

Fig. 4 shows a logarithmic plot of the load vs. the diagonal for the hardness determinations made in Table III. This readily gives a good insight into the accuracy of the values because most of the points fall on straight lines. It is to be noted that the slope of the curves down to 1100° F sample is approximately equal. From this point the data forms straight line curves, but the slope of the lines decreases as the hardness decreases. This decrease in slope results in the wide variances in the calculated microhardness. It must be reasoned that, as the hardened steel is further tempered or softened, its work hardening capacities are thereby increased, and this influence is shown in the change of slope of the straight line curves.

Table III will, therefore, give approximate conversions of microhardness numbers when hardened and tempered steels are compared. Since wide variations in the microhardness numbers are possible, especially in the lower hardness ranges, the load of the penetrator should always be recorded when reporting any hardness value. Because of its highly-localized determination of hardness, the microhardness tester opens many new fields of metallurgical control and investigation. Quality control of production of many metal products is exercised by hardness testing. But, for example, with powder metallurgy[6] parts, conventional hardness testing has been generally unsatisfactory because of the porosity or duplex structure of the material. The hardness of structural constituents of metallic alloys can now be measured, because the conventional instruments like the rockwell had given an average reading, rather than particle hardness.

The different hardnesses between segregated crystals and their surrounding matrix is readily illustrated in the stellite alloys. The testing of carburized or nitrided layers, electrolytic plating, and of hard carbides offers a wide field of application. A surprising observation is that many crystals heretofore considered as "glass-hard and brittle" can be tested due to the minuteness of the indentation. Enamels, glasses and porcelain display in microhardness testing a "plastic behavior resembling that of metals."

Photomicrograph, Fig. 14, shows a microhardness impression made in a sample of high-manganese (Hadfield's) steel. The load on the indentor was 0.116-kg. Even with this small load on the diamond, the manganese steel shows its extraordinary ability to work harden. The faint outer edge of the impression would tend to show the true hardness of the material while the inner concentric rings show the effect of work hardening caused by making the impression. The outer edge was barely discernable at the first observation of the impression. A brinell hardness on the same section was 321, which is also showing the effect of work hardening.

Photomicrograph, Fig. 9, shows a microhardness impression in fine lamellar pearlite. A specimen of straight 0.90 carbon steel was normalized at 1600° F. This microhardness value of 338 is not consistant with hardness measurements made with a rockwell machine. With the lighter microhardness loads measuring soft materials, this variation can be considerable because of the high work hardening capacities of the softer materials.

Fig. 7 shows a leaded bronze bearing alloy. The hardness impressions were made in the globules of lead and in the copper alloy. The light 0.0195-kg spring was used to make these impressions. The calculated microhardness of the lead was 11.3 and 10.4. The microhardness of the bronze alloy varied from 169 to 130 vickers.

Fig. 8 shows a heat resistant 25-12 chrome-nickel alloy after a sigmatizing treatment of 1250° F for 500 hr. Microhardness of the austenite is 282, and of the sigma phase 452. Inaccurate values were obtained when hardness readings were attempted on the sigma phase. The small patches of ferrite, when upon transforming to sigma, broke up and the complex carbides formed small glomerated particles. The hardness of these extremely brittle particles was not directly measured when an impression was made in the center of a patch of these transformed products. Most of the resistance to penetration was, therefore, absorbed by the softer austenite. Piling-up and metal disturbance can be seen surrounding the impressions in the austenite. This condition will, therefore, give an apparent higher hardness of the softer austenite.

Application of the microhardness tester in measuring hard carbide particles is readily illustrated in the stellite alloys. Stellite[8] for the past two decades has been used to tip certain types of tools and as a hard weld-on facing material to protect wearing parts of all kinds. In many applications it became apparent that something other than the commonly determined physical properties was responsible for its excellence as a metal cutting tool and its long life under abrasive conditions. Welded coatings of stellite have shown that these alloys lasted longer under abrasion than other metals of even greater hardness. These peculiarities could be attributed to the property of red hardness. When the hardness is measured at room temperature by resistance to indentation, as in the conventional brinell or rockwell methods, cobalt-chromium-tungsten alloys are not as hard as hardened high-speed or hardened high-carbon steel tools, but, unlike iron-carbon alloys, they have no critical or transformation points and do not exhibit the phenomenon of tempering. Their hardness is inherent, the result of the composition and the method of manufacture.

The approximate compositions of these hard facing weld rod alloys are:

Element	No. 1 %	No. 6 %	No. 93 %
Cobalt	45-42	63-68	4-7
Chromium	28-32	27-30	15-19
Tungsten	10-15	2-6	....
Carbon	2.5	1.2	2.5
Iron	....	....	20
Molybdenum	....	....	13-17
Vanadium	....	....	0.5-3

Hardness of the alloys is such that

(*Please turn to Page* 140)

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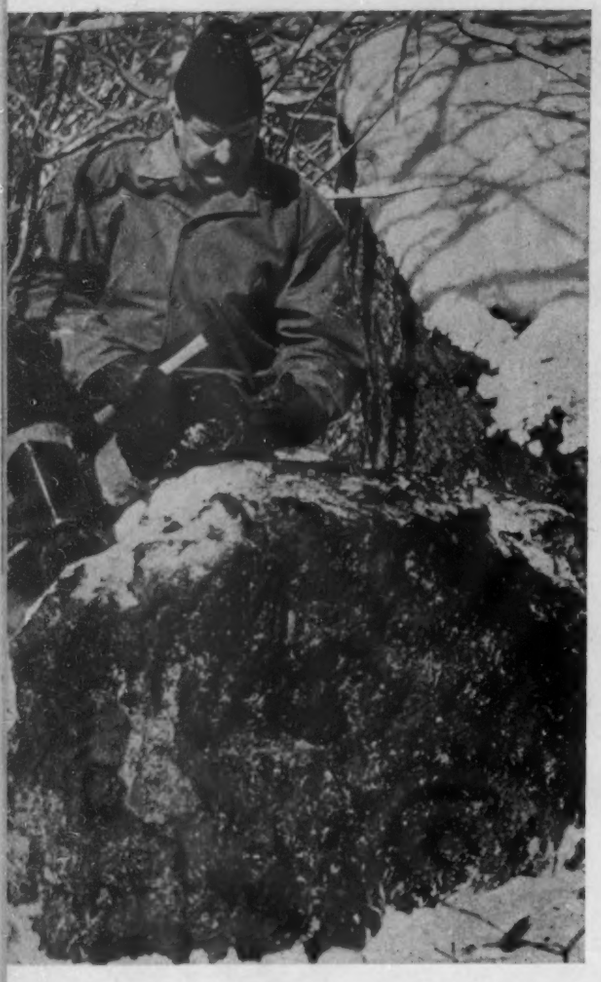


Left — Outcrop of iron ore on new Westland development in Ontario

Below—Great Lakes District showing location of iron ore deposits

EXPLORATION of new hematite deposits located in the Algoma mining area, Ontario, and claimed by the Westland Mining Co., Ltd., 24 King Street West, Toronto, is making considerable progress, according to J. W. Ferguson, president. Six channel samples taken from the deposits and assayed by the Provincial Department of Mines, Toronto, analyzed 64.41, 67.94, 68.14, 68.24, 66.33 and 61.79 per cent iron, respectively.

The nearest railroad is about 27 miles south, where the Canadian Pacific Railway, Soo branch, passes through Dean Lake, Ontario. Proposed plans of the Westland company include the construction of a 22-mile railroad to connect with the nearest shipping point to facilitate the moving of ore to Canadian iron and steel plants.

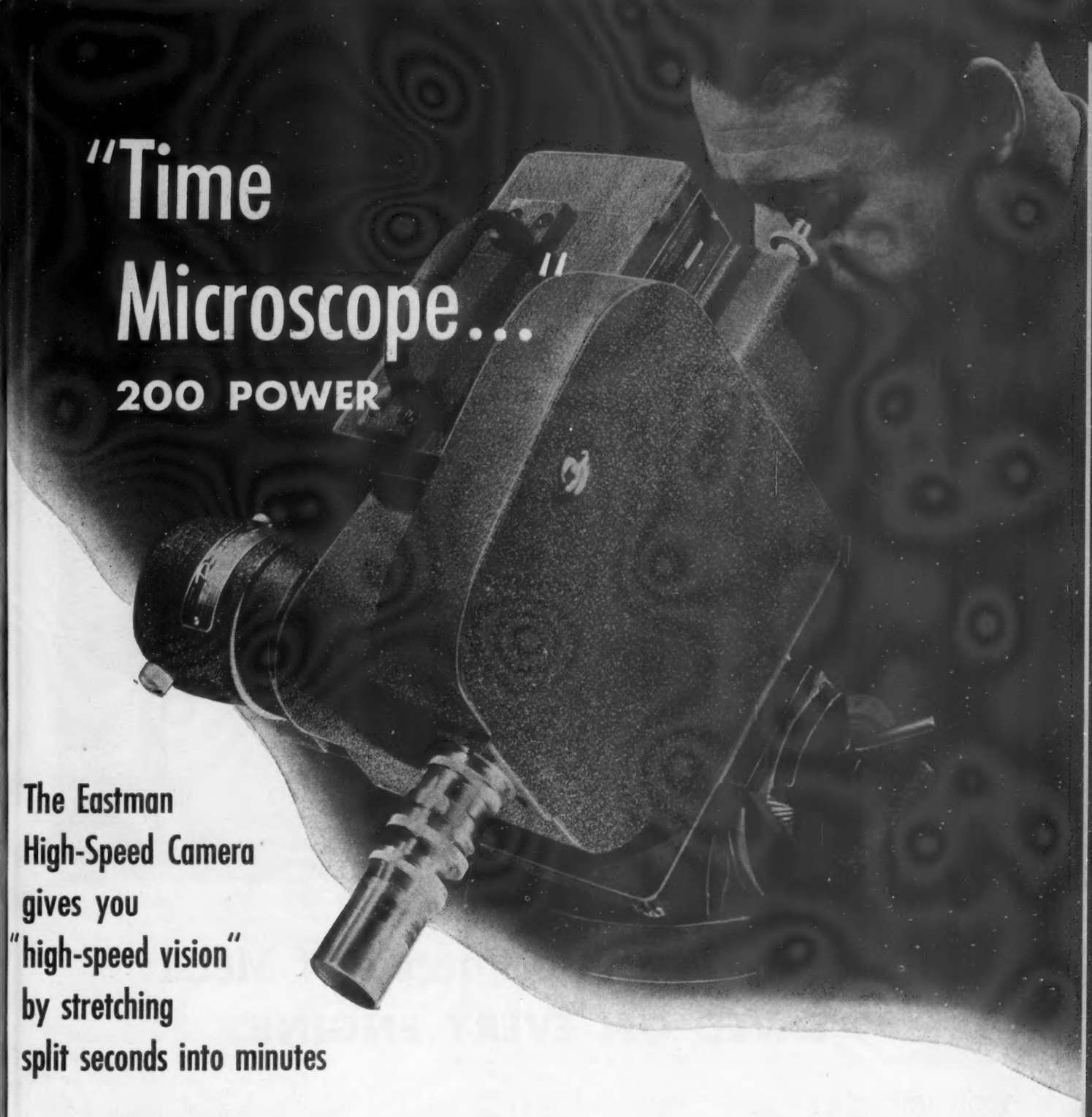
The area is characterized by woody, rocky hills having a local relief to 350 ft elevation. Northeasterly the property is underlain by conglomerate, greywacke and argillite of the Gowganda formation, with folded beds in the observed outcrops and having a general trend east and west, the dip varies from 20 to 30 degrees south. The southwest portion of the property is underlain by white Lorrain quartzite formation. The bedding is folded, the general strike being east-south-east with a general steep dip to the south.

Large bodies of diabase intrude the sediments and outcrop between the Gowganda formation and quartzite. In the zone where minor faults occur in the Lorrain quartzite, there are fissure fillings and replacement elements in the faults. The veins and replacements in the area being developed consist of quartzite and hematite. The latter where not intimately mixed with the quartzite, concentrate in veins of hematite. Soft hematite replacement vein filling has been encountered in this fault area.

The deposits consist of secondary quartzite and hematite, the latter being foremost part crystalline specularite. No sulphur or other deleterious matter has been found in the ore to date and it is the opinion of informed metallurgists that the material in the veins has the quality of high-grade iron ore.

Principal developments at present consist of surface stripping and rock trenching at the fault area, extending generally north of west from Stringer Lake for a length of about 4000 ft. Results of this surface work permit a planned diamond drill program to probe at depth, the width and lateral extension of known surface veins. At present the company is engaged in drilling its seventh hole.

The area covered by the 18 claims is being thoroughly explored. A picket line has been run parallel to presently known hematite occurrences and from this line at 200-ft intervals at right angle to same, the property is being explored to uncover other possible occurrences. The contact between the Gowganda formation and Lorrain quartzite is located in low area northwesterly from Stringer Lake and is covered by glacial drift.



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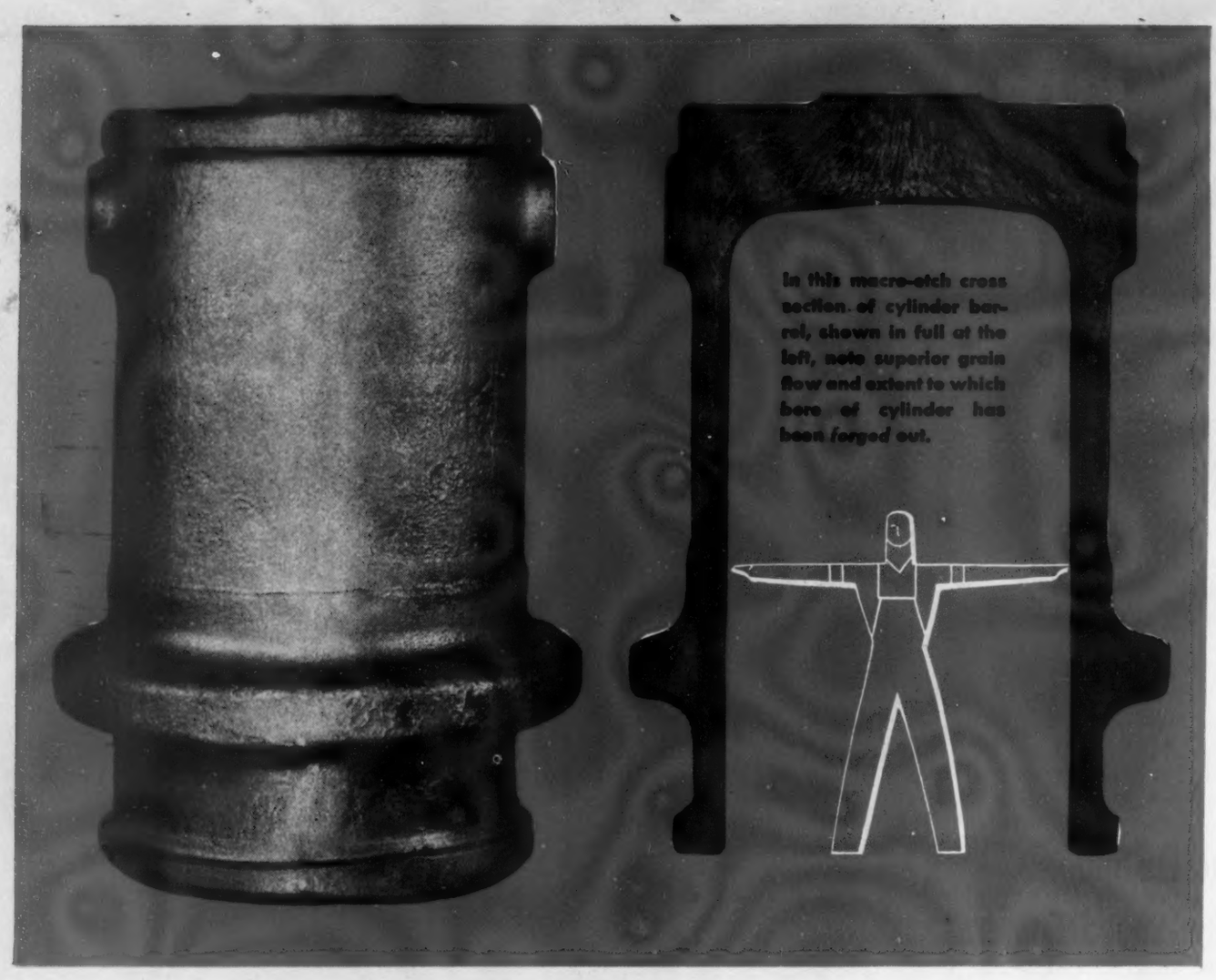
In this macro-etch cross section of cylinder barrel, shown in full at the left, note superior grain flow and extent to which bore of cylinder has been forged out.

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BRIGHT Alloy Plating

Description of process for producing a ternary deposit of copper, tin and zinc. High protective value of deposit and other physical and chemical properties commend it to wider use

A BRIGHT alloy plating process producing ternary deposits of copper, tin and zinc has been described by Myron B. Diggin and George W. Jernstedt[1]. The deposited alloy is bright as it is taken from the plating solution. It is reported to be hard and wear resistant, to have excellent tarnish resistance, to be non-magnetic and to have high protective value when applied over copper or copper alloys.

The process was developed by the Westinghouse Electric Corp.'s own Meter Division, Newark, N. J. for application where existing single metal or binary deposits could not meet severe military requirements during the war. The Hanson-Van Winkle-Munning Co. is co-operating with Westinghouse in introducing the process to the plating industry. Patents are now pending on the process.

There is little doubt that the war just ended placed increased emphasis on the study of the physical characteristics of many electrodeposited coatings. This was due to the fact that for many military purposes it was not sufficient simply to deposit nickel, copper, zinc and other metals under ordinary conditions. It was often necessary that plating solutions, operating conditions, and general technique be modified to produce deposits with pre-determined physical properties. The information gained will lead to a much different conception of electroplating single metals for many postwar applications.

Alterations of the physical properties of a single metal are limited because of the inherent properties of the metal. Chromium, for example, is always hard and comparatively brittle, regardless of the conditions of deposition. The relative hardness, however, can be varied within appreciably wide limits. Copper is an example of a relatively soft metal. Again, the hardness can be varied over fairly wide limits by modifying the electrolyte and operating conditions. The most pronounced changes in chemical and physical properties result from combining two or more metals to produce an alloy. The alteration of properties resulting from alloying have been extensively investigated in respect to metals in their usual commercial forms. In the field of electrodeposition it is generally believed that the plating of alloys has not received the attention it merits. If the future progress made in alloy deposition is only a fraction of that made in the metallurgical alloying of metals in their non-plated form, the electroplater may be in the "enviable" position of being able to produce a deposit which is custom-made for a specific application.

Varies from Standard Bath

An alkaline cyanide type electrolyte is used for the alloy plating process, and during the development of the process it was found necessary to make several variations from the standard cyanide bath in order to make the plating range sufficiently flexible for plating room control. In an alloy plating bath containing three metals such as copper, tin and zinc, it has been found that a controlled metal ratio is essential. However, a correctly chosen free sodium cyanide concentration in conjunction with the proper addition agent allows relatively large percentage variations in metal ion concentrations without correspondingly wide variations in deposit composition.

Composition of the plating solution is given in Table I. The bath preparation is as follows: Sodium cyanide and sodium hydroxide are dissolved in approximately three-fourths of the volume of hot water required in the tank. Then, in the order given, copper cyanide, zinc cyanide, sodium stannate, sodium carbonate, and finally, the BA brightener added. By maintaining a low total metal concentration, the solution is less expensive and less sensitive to fluctuations in operating conditions.

The bright alloy process produces deposits composed of copper, tin and zinc. The deposition of such an alloy is essentially not new, but the present process is novel in that anodes of the same composition of the deposit are used, thus automatically maintaining the metal concentration of the bath. Reference to this type of alloy plating can be found in the literature. Several Japanese patents[2] issued about 1928 cover a process of plating an alloy of copper, tin, and zinc with a room temperature bath using copper anodes and supplying zinc and tin to the solution through the addition of salts. It is reported that the deposits were soft, dull, and bronze in color, but were apparently satisfactory for the intended application.

Certain impurities normally present in the metals used in the production of these alloy anodes will not permit the deposition of bright deposits. The anode area should consist of 75 per cent insoluble material such as cold-rolled steel or carbon. Alloy anodes in steel containers serve as the remaining 25 per cent area. With this ratio of insoluble to soluble anode area the bath remains fairly stable in respect to the three metal constituents. This ratio was chosen because the anode efficiency is nearly 100 per cent, whereas the cathode efficiency is around 35 per cent. In addition to electrochemical solution, chemical attack on the anodes may become appreciable if the soluble anodes are allowed to remain in solution during extended idle periods.

When the anodes are corroding properly they will have a uniform gray ap-

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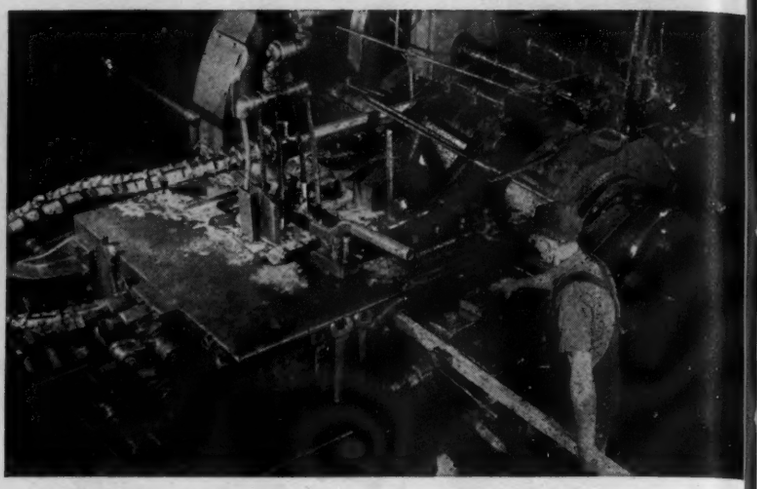

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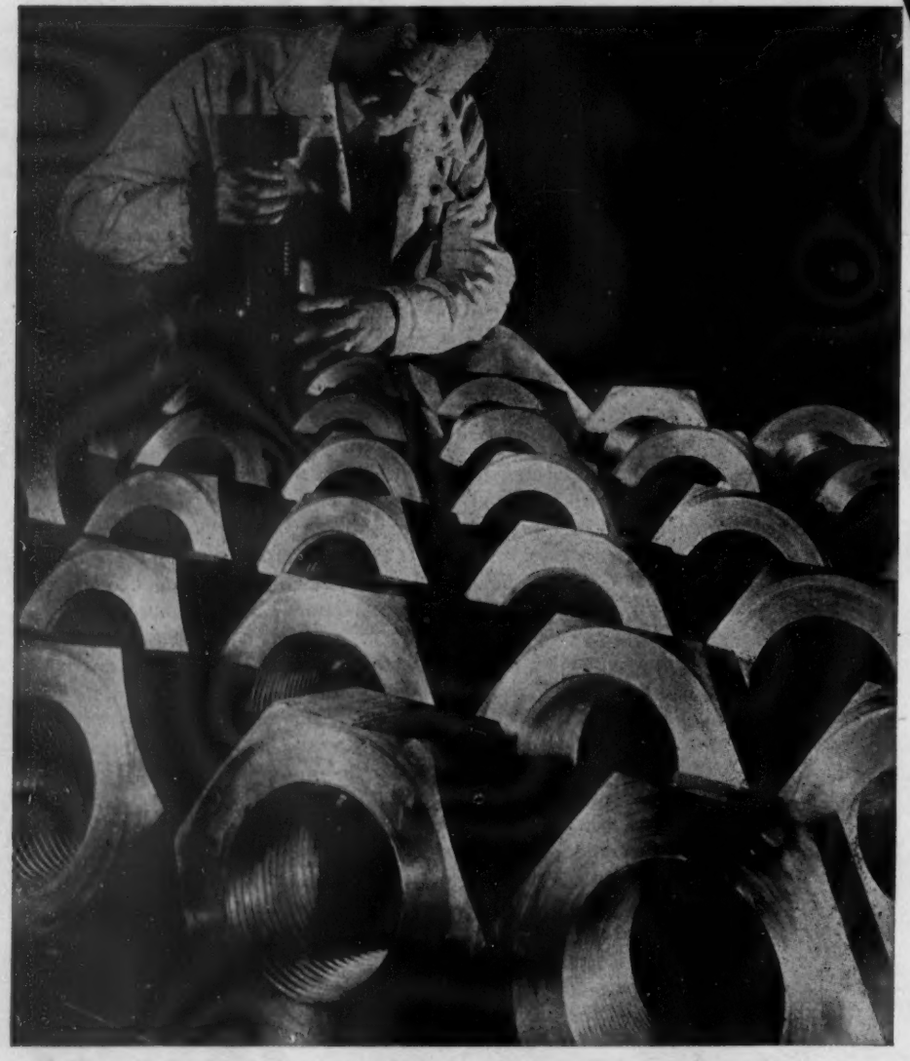

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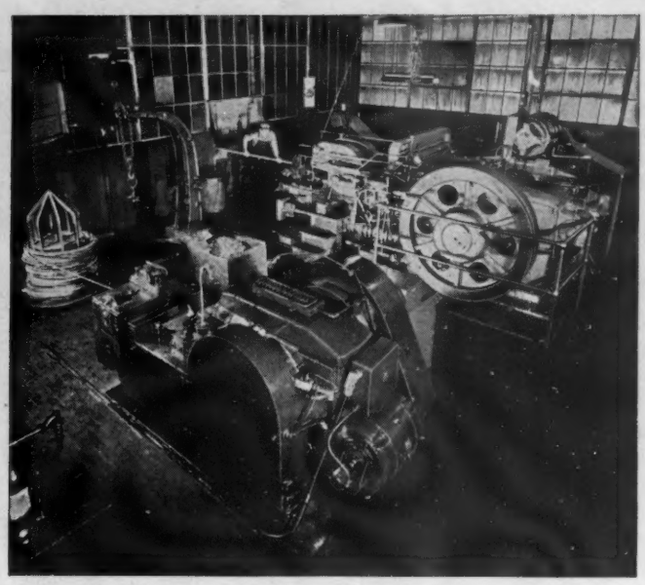

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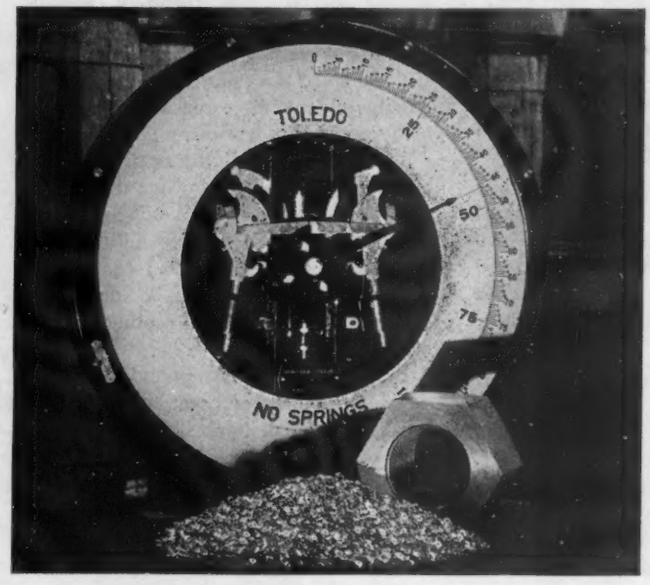

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pearance. If the anode current density is too low, they will develop a white film. A high anode current density will lead to the formation of a black polarization film. In general, it is reported that little difficulty will be experienced with anode corrosion if the pH is maintained above 12.6 and if the anodes are of suitable composition and structure.

Operation and Bath Control

The bright alloy solution is operated on a voltage basis in actual practice. With normal anode-cathode spacings, the voltage in still plating is maintained between 3½ and 4½ v; in barrel plating from 5 to 6 v is employed. Current density at this voltage is between 10 and 15 amp per sq ft. Under these conditions it requires approximately 23 min to produce a deposit 0.0002-in. thick.

Temperature of the alloy bath is maintained at approximately 145°F by steel steam coils. Cloudy deposits may result if the temperature is lower than 140°F and higher than 150°F in still plating. In barrel solutions the most favorable temperature range is 150-160°F.

The pH of the bright alloy bath should be maintained between 12.6 and 13.0 as determined electrochemically with a type "E" glass electrode. Sodium hydroxide is used to increase the pH value. At around 12.7 the bath is sufficiently buffered so that further additions of sodium hydroxide do not raise the pH appreciably. If the pH drops below 12, hydrolysis of the tin salt in the solution may occur and thus disturb the metal ratio. Also, tin salts should not be added when the solution pH is below 12.0.

The addition agent has strong "wetting" or surface tension lowering qualities. Because of this it is important to rinse plated work well to remove the addition agent before drying, especially in assemblies where solution tends to remain because of capillarity. If the work is not properly rinsed, staining is likely to occur when the articles are stored under conditions of high humidity. However, in general this observation holds true for any alkaline bath containing a wetting agent.

In general, this type of alloy plating bath will be found more difficult to control than the usual single metal bath. However, it is said that with proper analytical control, it has been possible to maintain a high production in a plant where there have been twelve tanks in operations for a period of over two years. Table II provides the working limits for the constituents of the solutions.

TABLE I
PLATING SOLUTION

Chemical	Amount
Copper Cyanide	0.50 oz/gal
Zinc Cyanide	0.27 oz/gal
Sodium Stannate	0.22 oz/gal
Sodium Cyanide	3.75 oz/gal
Sodium Carbonate	4.00 oz/gal
Sodium Hydroxide	0.60 oz/gal
BA Brightener	6.00 cc/gal

TABLE II
SOLUTION CONTROL

Constituents	Limits
Copper	0.32 - 0.38 oz/gal
Zinc	0.13 - 0.17 oz/gal
Tin	0.08 - 0.12 oz/gal
Free Sodium Cyanide	2.00 - 2.50 oz/gal
Sodium Carbonate	4.00 - 10.00 oz/gal
BA Brightener	2.00 - 8.00 cc/gal

For barrel plating, the free Sodium Cyanide limits are altered to 2.75 - 3.25 oz/gal.

A pH interval of 12.6 - 13.0 is maintained for Sodium Hydroxide.

Rapid Methods of Analysis

Rapid methods have been developed for the analysis of all bath constituents[5]. In commercial operation, chemical analysis can be supplemented by observations of the color and luster of the deposits and additions made between analytical periods based on previous experience. The information relative to visual control given in Table III may be of value.

However, if the deposits are cloudy despite satisfactory solution balance as indicated by analysis, solution should be treated with hydrogen peroxide (100 volume) in proportions of 1-3 cu cm per gal. Solution can be used immediately after this treatment.

In the analytical procedures copper is determined by standard electrolytic methods wherein the metal is deposited on a weighed platinum cathode. Zinc is determined in the solution from which the copper has been removed. The solution from the copper determination is made strongly alkaline and a quantity of sodium thiocyanate added. It is then electrolyzed using the same cathodes employed for the copper determination. Tin is determined by an iodometric titration of the copper-free solution, in which the tin is reduced by hydrochloric acid and iron powder. Sodium carbonate is determined by the centrifuge method. The addition agent concentration is determined by surface tension tests using a Traube Stalagmometer.

Alloy Composition

The composition of the alloy deposit, as determined by many checks on production runs is given approximately as follows:

Copper	56 per cent
Tin	28 per cent
Zinc	16 per cent

Diggin and Jernstedt state that there is little difficulty in consistently depositing the three metals in the proportions given with temperature control and with the solution in proper balance chemically. Deposit thickness can be measured with a standard drop-test apparatus, using a dropping solution prepared from ferric chloride and copper sulphate.

The ternary copper, tin, zinc alloy deposits have several advantages not inherent in the individual metals. For example, the alloys reported to be very easily soldered with rosin as a flux. In some cases it solders better than tin; the reason for this is that tin apparently develops an oxide film on standing or in storage which affects subsequent soldering operations. The bright alloy finish resists oxidation and tarnishing to a much greater degree and therefore solders easily under production conditions even on parts stored for long periods of time. In addition, the alloy is much more readily soldered than nickel, which normally requires a corrosive acid flux.

The ternary alloy deposit is reported to have special advantage for use in the electrical field because it is non-magnetic. This property is especially desirable in the manufacture of electrical equipment. It has also been found to be ideal as a decorative and protective coating on fine instruments.

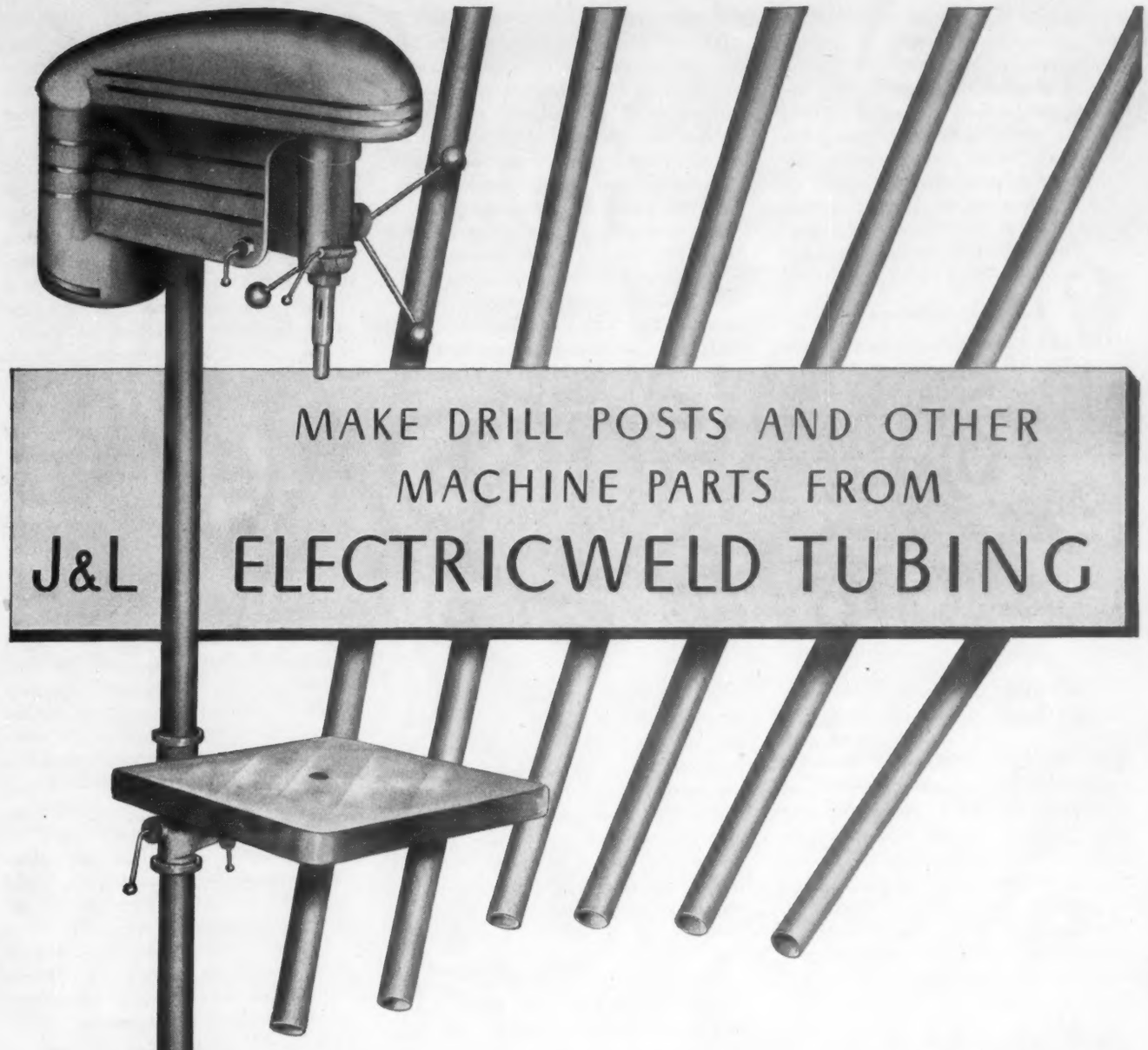
In production it is reported that it is possible to obtain excellent adhesion with greater ease than is possible with nickel plating. In some cases edges are peened over on production items where a coating of 0.0002-in. of alloy has been deposited. There has been considerably less flaking and evidence of poor adhesion of coatings than when nickel was employed, according to Diggin and Jernstedt. These phenomena can be explained, in part, by the fact that nickel is plated from an acid bath and is highly stressed, whereas the alloy is plated from a warm cyanide solution.

The ternary alloy deposit is reportedly produced with good throwing power—better than that usually realized with any of the commonly used single metal solutions. Cross sections of standard hardware have shown that screw threads have almost uniform thickness over the entire contour. Cup-shaped articles and parts with recessed areas also show a remarkably uniform distribution when plated in the alloy solution.

The alloy is relatively brittle when deposited to obtain heavy coatings; however, it is seldom used in thicknesses over 0.0002-in. Its hardness is reported

TABLE III
DEPOSIT CONTROL

Deposit Color	Solution Condition
Blue plate	Too high overall metal content
Brassy plate	Low cyanide or low tin content
White, cloudy plate	High tin content or low pH
Gray, cloudy plate	High zinc content



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to be greater than that of nickel and its wear resistance is superior to normal nickel deposits. Coatings of 0.0002-in. of alloy plate are reported to give approximately the same reading on a Taber Tester as 0.0005-in. of nickel from a low temperature Watts nickel solution. Although the cathode efficiency of the solution is only about 35 per cent, in view of the relatively thin deposits used, plating time is said to be on a comparable basis with a standard nickel finish.

Corrosion Resistance

One of the outstanding properties cited for the bright alloy coating is its corrosion resistance. On brass or copper base metals, it is possible to pass the 200 hr salt spray test with a thickness of only 0.0002-in. even after being salt sprayed for 200 hr, there is little or no corrosion product formed on the surface. An explanation of this unusual result may be that the electrochemical potential of the alloy lies between copper and brass. Therefore, even where pores exist the local cell corrosion rate is negligible.

An extremely important use for the bright alloy coating is cited because of its non-staining and corrosion-resistant properties; namely, radio-frequency instruments. The nickel thickness required for proper corrosion-resistance in a certain radio-frequency application was determined to be 0.0005-in. This thickness led to a high electrical resistance, since all of the current was carried in the surface layer. In substituting the alloy deposit for nickel, it was found satisfactory to apply only 0.0002-in. thickness, this thinner coating passing both electrical and corrosion tests.

The bright alloy plating process is not recommended for application directly on steel, where the prime requisite is corrosion protection Although it is reported that the deposit can be applied satisfactorily to steel on a production basis, it is much more advantageous to apply a copper undercoating and secure the benefits of low corrosion rates between the bright alloy and the copper.

The natural luster of the bright alloy finish and the uniformly bright, white color makes it attractive from the appearance standpoint. It is reported that since the process is controlled on a voltage basis, the color produced is unusually uniform, and that parts plated by various methods such as still plating, barrel plating, and basket plating can be assembled into a unit without differences in color or luster being apparent. Where it is desired to produce a mirror-like surface, the alloy deposit can be colored more readily than nickel. The actual reflectivity approaches silver (80-85 per cent), since the composition of the alloy deposit is almost that of cast and polished speculum mirror.

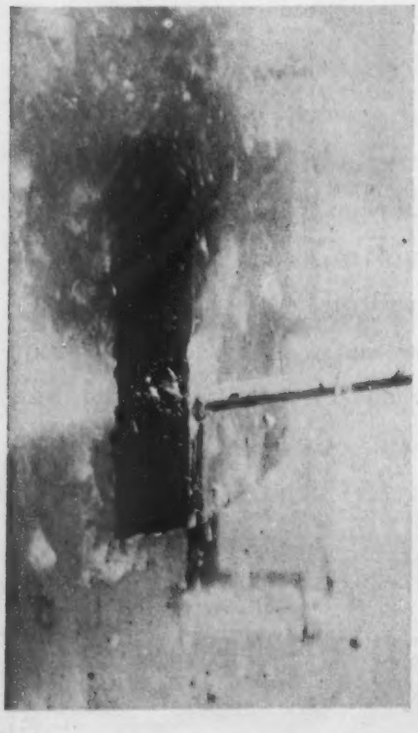
Although this alloy plating process requires closer analytical control, other benefits such as ease of soldering, abrasion resitance, corrosion resistance, bright deposits, good electrical properties etc. may readily justify its use in comparison with a more inexpensive process It is reported that for many applications, the actual cost has been shown to be comparable to a standard nickel process.

REFERENCES

[1]Proc. Am. Electroplaters Soc. (1944)
[2]Japanese Patents Nos. 91,139 and 88,454
[3]Trans. Electrochem. Soc. 82 135 (1942)

Underwater ARC-OXYGEN Cutting

A TUBULAR arc-oxygen underwater cutting electrode, developed from two independent steel cutting operations, utilizes the 6000 to 10,000° F arc flame temperature for underwater kindling of steel plate and beams to the burning point. Into the molten steel thus produced, a jet of pure oxygen is directed through the bore to cut the steel cleanly, as shown in accompanying illustration. The electrode, until recently manufactured solely for war purposes, is produced by Metal & Thermit Corp., 120 Broadway, New York.



The electrode has made possible the amazing speed with which invasion harbors have been cleared of sunken ships by Navy salvage and Seabee forces, and has permitted the underwater trimming and welding of ragged shell and torpedo holes in vessels afloat to enable them to proceed to drydock for permanent repair. So fast is the underwater cutting process that ½-in. steel plate has been cut at the impressive rate of 52 ipm.

For cutting heavier steel underwater, a Murex tubular electrode (type CT) is employed. This is 5/16-in. OD and 0.112 in. plus or minus 0.008 in. ID. This method of cutting is faster and less hazardous than any other known method of underwater cutting. The electrodes have extruded and waterproofed coatings. Changing of the electrode can be easily accomplished under water.

Tests give average underwater cutting speeds ranging from 12 to 15 ipm for 1½ in. steel plate, to 30 ipm for ¼-in. plate. The maximum underwater cutting speed ranges from 36 in. for 1 in. plate to 62 ipm for ¼-in. plate.

The tubular steel electrode is said to be effective in cutting nonferrous metals and iron, and has been proposed for open-air cutting of high alloy steels, such as austenitic stainless steel.

An underwater welding electrode, known as Murex type CW, also has been developed in ⅛-in. to ¼-in. sizes, while the 3/16-in. size is widely used for general salvage work, and is employed for welding plate from ⅛-in. to heavier thicknesses.

New Boiler Design Enlarges Furnace Area

Simplified new boiler design that requires 40 per cent less space than average boiler of equal capacity is said to make possible larger grate and furnace area. With furnace area and grate in direct proportion to required heat release, units made by John Phillips Badenhausen Inc., 1822 Packard Building, Philadelphia 2, perform to rated standard without forcing, officials state.

Easy cleaning is made possible by overhead position of steam drum with which both primary and secondary tubes are directly connected. Full length tubes and consequent maximum efficiency are insured by use of headers instead of lower drums. Priming and surging are eliminated.

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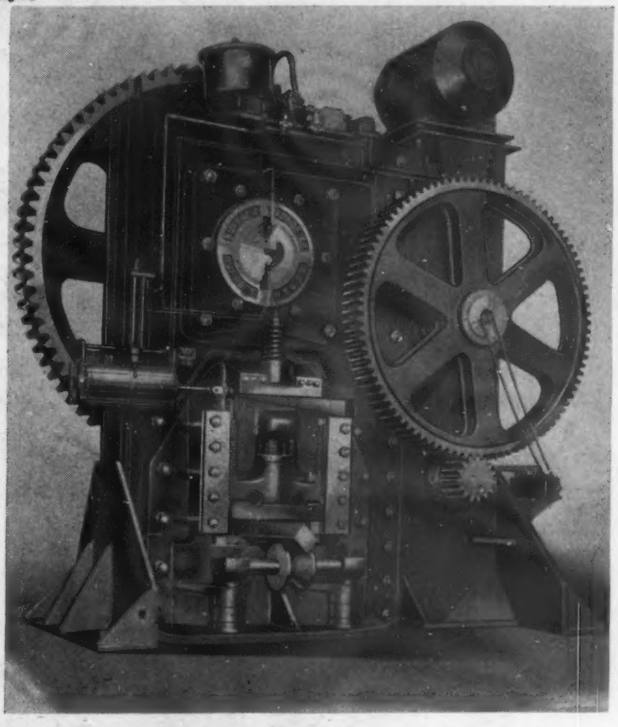

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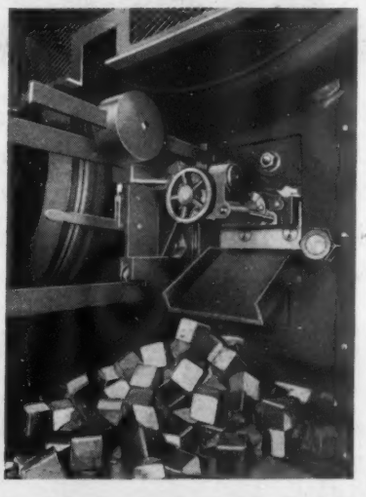

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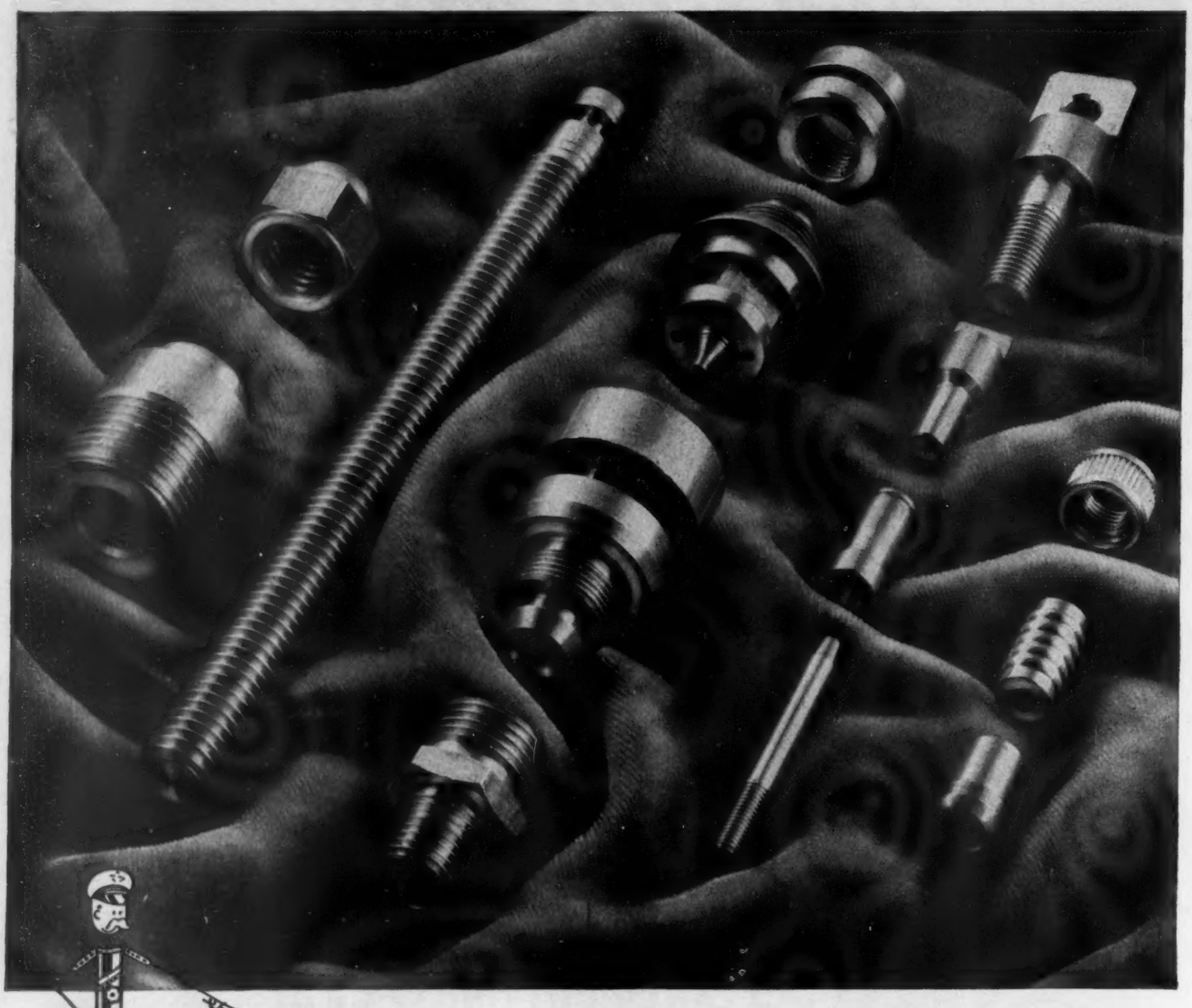

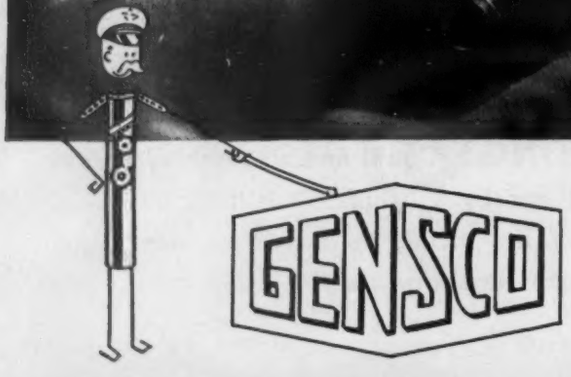

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Lockheed Aircraft Finds Many Uses for

METALLIZING

Fig. 1

Master patterns for profiling machines, metal shells to hold work for drilling and trimming, welding machine and other machinery parts all built up by metal spraying

●

Fig. 1—Metal spraying a form

Fig. 2—Four successive stages of rebuilding spot welding electrodes to a new size by metallizing

Fig. 3—P-38 wing fillet master, restored to proper size by metallizing after it had been improperly machined

Fig. 4—Sprayed metal surface next to plaster and rubber cement after rough cleaning

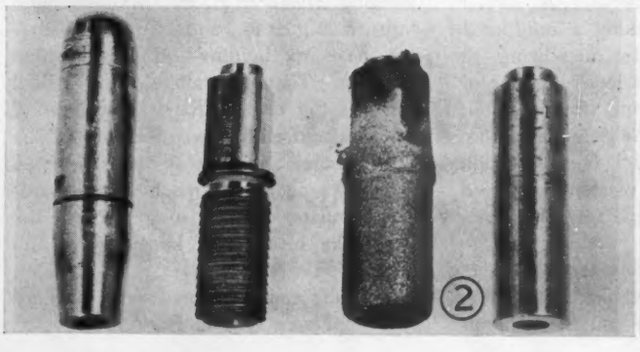
LOCKHEED Aircraft Corp. is constantly making and planning new applications of metallizing. Whenever a possibly advantageous use can be found for this technique, thorough tests are made to determine its practicability, with the result that many diverse uses are approved.

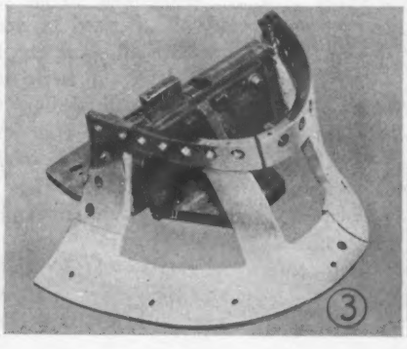
Headquarters for metallizing at Lockheed are in company's Tooling Division, at Burbank, Calif., where new tooling, jigs and fixtures are constructed and reworked. All such operations are under the direction of the division supervisor, who is also responsible for welding, heat treating and small standard tool production and maintenance.

Some of the methods utilized in this shop to make master patterns for profiling, to reclaim worn or damaged portions of expensive equipment, and to restore to usefulness steel parts that have been machined too deeply, are set forth here.

Spot Welder Salvage: A good example, and one that effected a great saving, is illustrated in Fig. 2. First exhibit shows the taper on the lower end of an electrode used in spot welding. This is the end that fits in the electrode holder. After a large number were purchased, however, and 15,000 were still in stock, a new type of holder was adopted as standard equipment, because it was more efficient and less expensive to maintain. These Mallory metal (copper-beryllium) electrodes cost $2.54 each. They were all made efficiently usable by metallizing, at a cost of 10 cents each.

First the electrodes were machined to prepare for metallizing, as shown in No. 2, and then sprayed with Metco copper, a material developed by Metallizing Engineering Co. Inc., Long Island City, N. Y., to give the appearance shown in No. 3. (Nos. 1 and 2 do not match 3 and 4 in all dimensions but will serve for illustrative purposes, being the only ones





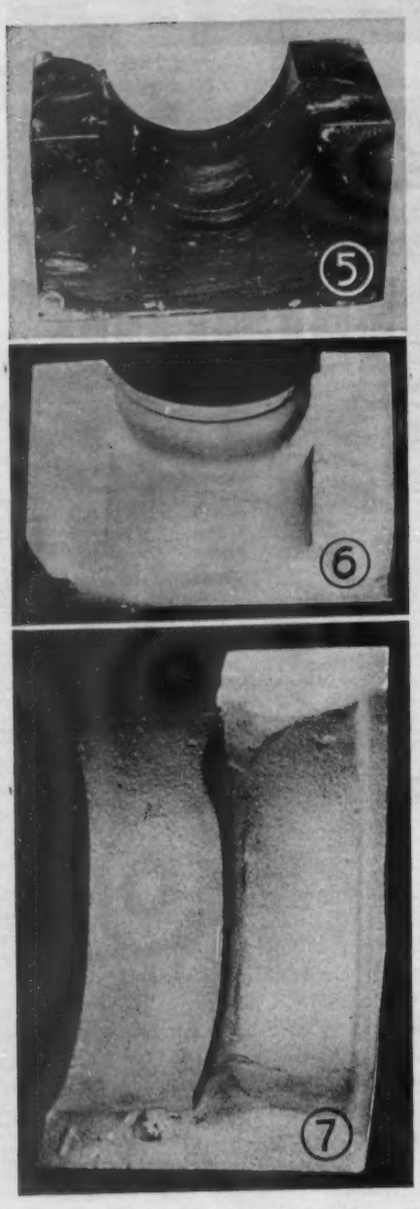


Fig. 5—Plaster form employed in making master pattern for use on profiling machines. Plaster is sealed by sprayed rubber cement

Fig. 6—Plaster form after spraying with five alternating coats of zinc and copper 0.020-in. thick

Fig. 7—Reverse side of part shown in Fig. 4. Photos and data courtesy of Metallizing Engineering Co. Inc., Long Island City, N. Y.

available). No. 4 shows the electrode after it was machined to fit the new holder.

Keller and Hydro-Tel Profiling Masters: Metallizing on the P-38 wing fillet master, Fig. 3, was estimated to have saved about 500 manhours and many machine hours that would have been required to construct a new one with its close tolerance dimensions. This unit was part of a large holding jig over which the aluminum skin was fitted and held with clamps for drilling and trimming. Its streamlined contour fitted that portion of the wing where it joined the fuselage. Drilling was done from the inside out, through the large holes in the side and top, and the smaller holes below. Trimming around edges of the skin was done with a power saw.

When the steel part was formed on a Keller profiling machine, an error in the engineering print caused it to be machined down 3/16-in. too far in some areas, making it unusable. After a grit blasting surface preparation, the missing 3/16-in. was built up with Metco 1 per cent zinc aluminum, and then quickly machined to true dimensions, the whole rework operation requiring but 8 manhours. Fillet master then was as serviceable as though properly made in the first place.

Master Patterns: In making master patterns for use with the Keller and Hydro-tel profiling machines, method used also is based on metallizing. These patterns are used to guide the operations of these machines in cutting steel or other metals into like form. As shown in Fig. 5, a plaster form is made with inner contours of exactly the same shape and dimensions as the part that is to be reproduced. Larger, extended outer dimensions are used to allow for trimming down to exact size, rather than trying to make precision edges. The plaster is sealed with a rubber cement spray. Then metallizing spray is applied. This particular sample piece was given five alternating coatings of zinc and copper, each approximately 0.020-in. thick. Actual spraying is shown in Fig. 1, and the completed job, Fig. 6.

Shown in Fig. 4 is pattern surface used for guiding operation of the profiling machine, after plaster has been removed and surface rough cleaned preparatory to final trimming and polishing. Plaster was removed by cutting a thin slice from each side with a Do-All saw, then carefully knocking most of the remaining plaster off and cutting out the balance with a knife, followed by sandpapering. Black spots are particles of rubber cement, which are removed during final cleaning. Fig. 7 shows reverse surface of Fig. 4.

Reinforced Metal Shells: A similar method is used in making a reinforced metal shell, built up by metallizing, to hold large (up to 16 ft long) sections of wing skin for drilling and trimming. Using proper part of the wind mock-up for a male section model, female section is formed around it in plaster, reinforced with hair, and steel pipe for larger sections.

This form is given one coat of zinc, and then built up to about ⅛-in. thickness with Metco 1 per cent zinc aluminum. When the shell is carefully removed, it is an exact reproduction of the wing mock-up. The shell is then held to exact form and dimensions by placing it over an expanded wire mesh form reinforced with 4130 ¼-in. OD steel tubing, criss-crossed and welded to its inner side. Necessity for making this form a very close precision job is eliminated by joining it to the inner side of the shell with another 1 per cent zinc aluminum spray, which also fills up any interstices between mesh and shell.

When the complete nesting form is thus built up and made a part of a large holding jig, outer female steel drill and trim master, with guiding drill holes in it, is placed over the metallized female nesting form, and holes are drilled in the latter. After aluminum skin sections are placed between the two forms it is a simple matter to drill through the outer holes and the skin. To construct this inner form by any other method than by this metallizing build-up would be much slower and more costly. In addition, layout lines (water, chord, butt, trim and drill) are made in plaster, and are transferred to the metallized shell to give precise guidance in fitting and completing the form.

Machine Tool Maintenance: Maintenance metallizing is a continued procedure on grinder and motor shafts, lathe and mill quills, mill arbors, stub arbors, etc., with an average of one a day coming in from various Lockheed plants. They range in size from ½-in. to 4 in. diameter, and are built up from 0.020-in. to 0.125-in. as required. Metcoloy No. 2 stainless, or Sprasteel No. 120 is generally used, depending on the hardness desired, and finishing is by grinding. New shafts that have given 1 to 2 years' service before metallizing was required are expected to give 5 years' service after being metallized.

Corrosion Protection: Steel anodizing tanks and baskets are given full corrosion protection by spraying with zinc for an estimated life of 1 yr. Without this coating, products of corrosion would disturb balance of the anodizing solution.

Electric Roll Welders: Metallizing also is used in constructing water-cooled, roll welding wheels or disks. Mallory metal hubs, 8 in., 10 in., and 12 in. in diameter, have six holding-bolt holes drilled in them. Then several holes are drilled towards the center from the middle of the rim, and ending where they join the center hole. A short distance in from the rim, a channel is machined, and water circulates around and through the spoke-like holes, thus keeping the hub cool.

Welding contact is made by a Mallory

(*Please turn to Page* 138)

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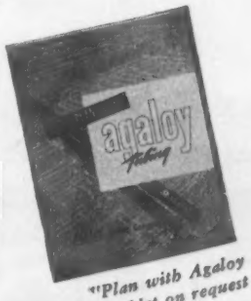

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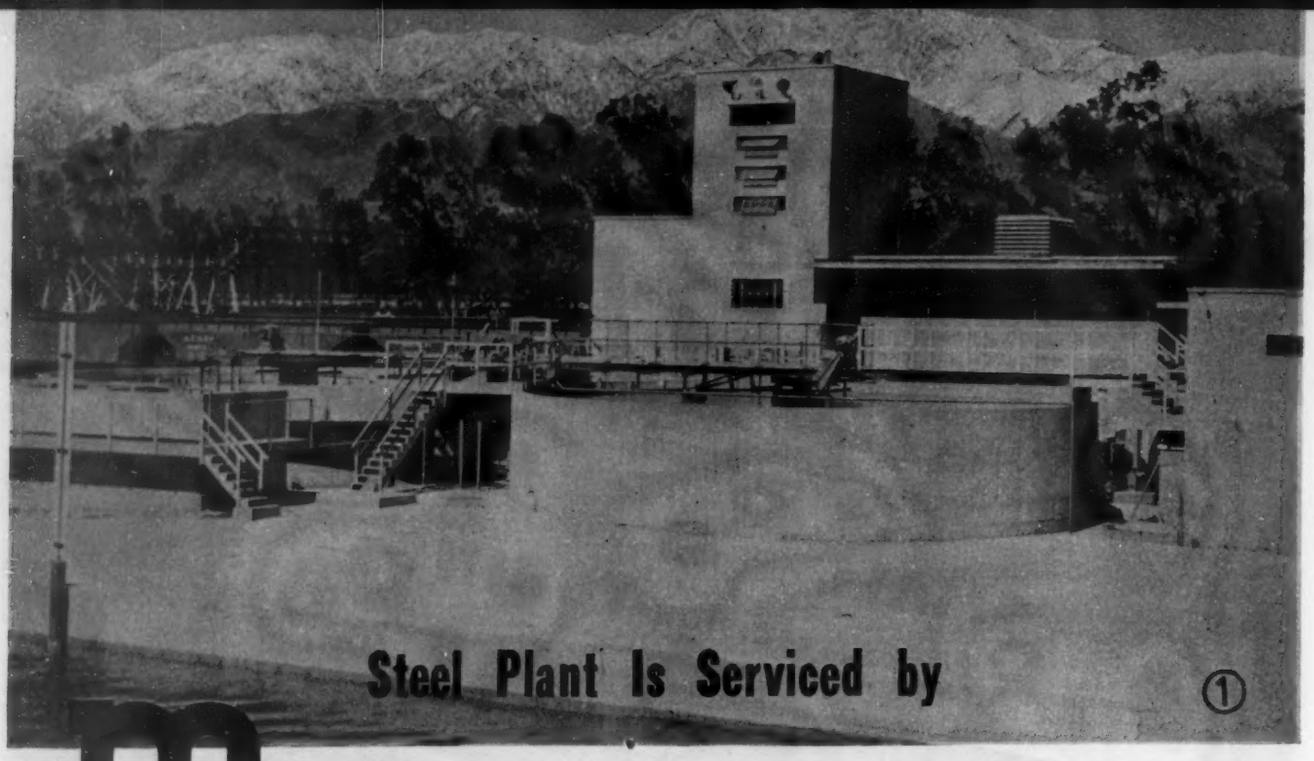


Steel Plant Is Serviced by

Modern Water Works

Supply mains bring water to Kaiser's treatment plant where it is softened, clarified, recarbonated and divided into industrial and domestic ground-level reservoirs. Four main industrial recirculating circuits handle 2½ million gallons per day. Water determinations are made by plant chemist. Large cooling towers are provided

By G. ELDRIDGE STEDMAN

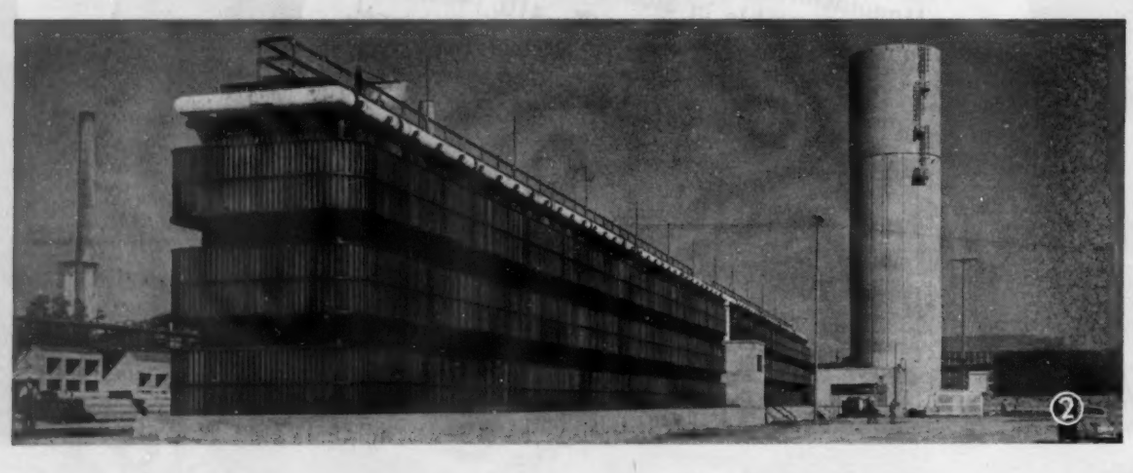
EXCEPT for the location, the wide spacing of its buildings, the excellence of its materials handling, its very latest equipment and its surprising housekeeping, the steel mills of the Kaiser Co., Inc., Fontana, Calif., are fundamentally similar to others. Its water works, however, presented a huge problem which has been adequately solved.

Gaining its water from Lytle Creek and Chino basin, the Fontana Union Water Co. supplies Kaiser Co. with 2,550,000 gpd. Though this is more than ample, Kaiser has drilled two 800-ft standby wells with a present pumping rate of 1900 gpm each, the water being of the same quality as from the water company. Well casings are double 8 gage 20 in. diameter, accomodating 18-in. pumps which are 250 hp turbine units operating at 960 rpm with 1900 gpm capacities against total head of 410 ft, including 385-ft lift out of the well, the static head and pipe line friction head.

Metered into an intake box, the Fontana Union water flows by 21-in. gravity pipeline into a treatment plant. There is likewise a 21-in. pipeline from No. 2 well connecting with a 24-in pipeline

Fig. 1—Headhouse, hydrotreaters, industrial recarbonation basin and industrial reservior

Fig. 2—Cooling tower No. 1, industrial pump house and elevated industrial tower



from No. 1 well to the treatment plant, all supply lines being of centrifugal reinforced concrete pipe. Each flow is governed by gate valve.

Domestic water is alone filtered, being used for drinking, washing, sprinkling, fire fighting, steam boiler makeup, lawn and garden sprinkling, waste-heat boilers, locomotives (10 in use) and laboratories. Industrial water is circulated and recirculated for cooling various furnaces, heated fixtures, gas washing, slurry handling, coke quenching, sinter, slag, condenser coils, heat exchangers, cooling mill rolls, descaling and mill finish, cooling pig casting machine and other purposes.

Better than 2,550,000 gpd is recirculated with 1000 gpm loss caused by lawn sprinkling, evaporation and irrigation. The four main industrial circuits are (1) main industrial, serving the open hearths, coke plant, blast furnace, (2) power house, including a cooling tower and recirculation on turboblower bearings, (3) coke plant, including a forced-draft cooling tower, quench and fractional operations, (4) the mill area—which handles motor room cooling of all mills, mill water, bearing cooling, descaling and scale flushing.

Water reclamation includes condensing, neutralizing treatment, clarifying, reconditioning, softening, cooling and pumping to restore pressure.

Pipelines are cast iron, steel and reinforced concrete. Steel pipe is enameled inside, and coated and wrapped outside where embedded. Joints of the concrete supply lines are collared and sealed with portland cement grout.

Incoming water entering the treatment plant sand box in the head-house basement, being controlled by gate valve, is discharged from the box ripples over a 27½ ft. weir and enters two basins which in turn discharge into an 18-in. pipe serviced by a meter, either or both pipes going to one of two 50 ft diameter hydrotreaters. Design capacities of the treatment plant are:

Units	Capacity, each, gpm
Hydrotreaters (2)	3,000
Recarbonation basins (2)	3,000
Rapid sand filters (3)	1,000
CO_2 generator	3,500
Domestic reservoir	500,000
Industrial reservoir	1,200,000

Gate valves control water flow into the plant. The sand box settles out coarse particles. The weir aerates gases from the water. Basin gates regulate hydrotreater water flow. Meters totalize the flow and operate the electrical impulse controlling chemical feeders. Hydrotreaters remove suspended solids or those in solution as well as colloidals, being equipped for their collection, pre-

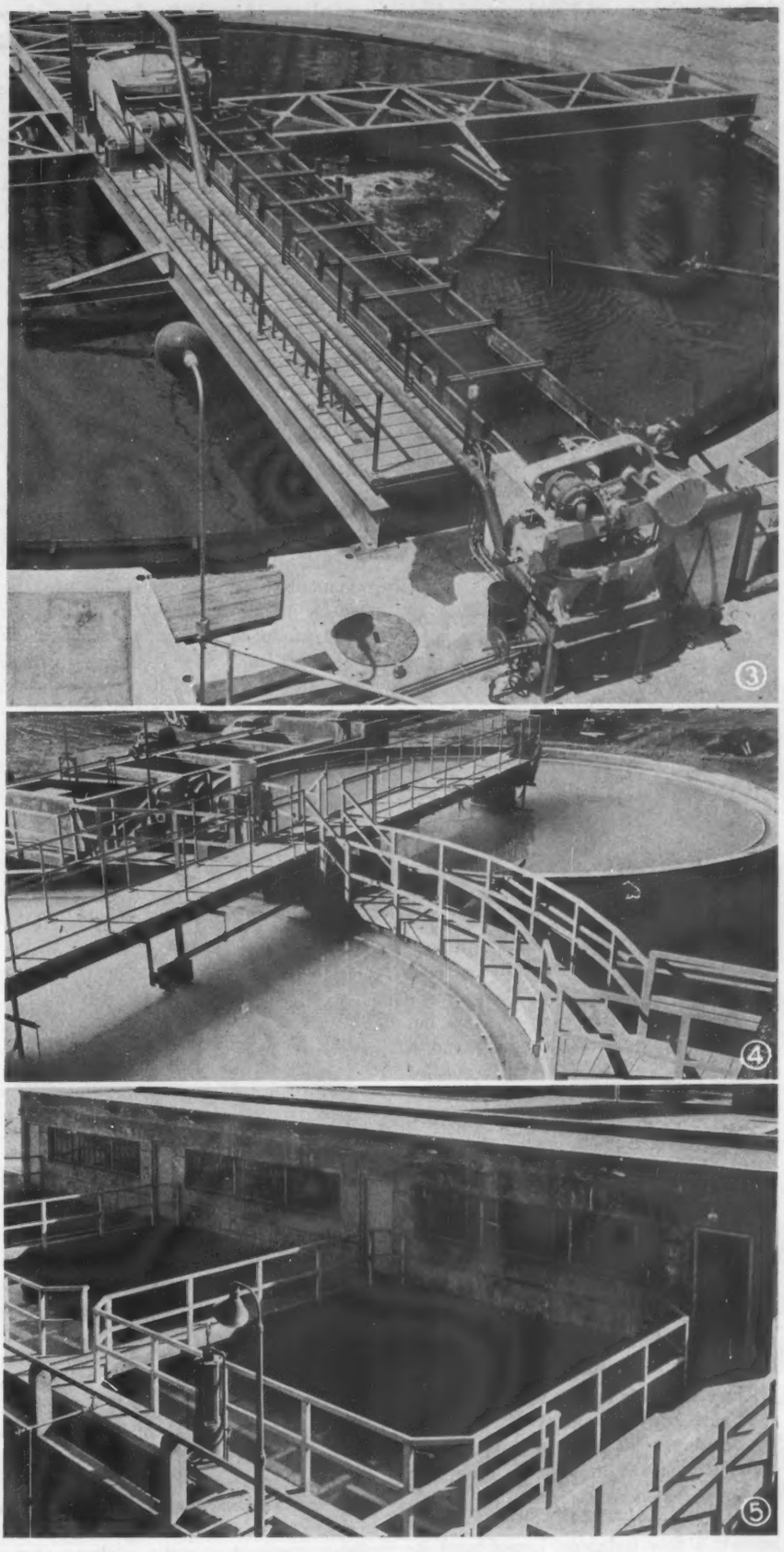


Fig. 3—Clarifloculator, 70-ft diameter, at cooling tower No. 2

Fig. 4—Hydrotreaters at water treatment plant

Fig. 5—Filters and operating house at water treatment plant

cipitation and removal as heavy sludge. Chemicals for coagulation are herein added to the water. The hydrotreaters operate in parallel or singly, the effluence being divided, after recarbonation, to the industrial basin and through rapid sand filters into the domestic reservoir. A 21-in. by-pass pipeline is installed for industrial water to escape the water treatment if desired. Domestic water cannot bypass the treatment plant.

Two 290 x 80-ft. sludge drying beds are adjacent to the reservoirs, into which sludge is pumped from the hydrotreaters by pumps through a 6-in. pipe line, one bed being used while the other is drying.

Chemical application of pebble lime from a 50-ton storage is by hopper feed, using a belt-type gravimetric automatic feeder and slaker. Ferric chloride, from 1200 gal holding tanks is fed by feeders controlled by timers impulsed from flow meters on the influent pipes.

Material Is Fed Dry

A dry feeder is employed with sodium aluminate or alum when ferric chloride is not used. Chlorine is piped from 1-ton storage cylinders to sterelators, proportioned manually, applied to the water as it enters the 18-in. influence of the hydrotreaters and into the effluent from the sand filter. Using a hose diffuser, the chlorination point can be varied to control algae and sterilization.

In this recarbonation process, carbon dioxide gas is used by burning blast furnace gas in a brick furnace equipped with a coke oven gas pilot with a metered gas supply piped from the blast furnace gas holder. After burning, this gas has about 22 per cent CO_2 content and is piped to a scrubber containing crushed limestone for cooling and spray washing. Compressed by a rotary gas pump to 4 psi, driven by a 7½-hp motor, the gas is dried on the pump suction line and this compressed gas is then piped to the two separate recarbonation basins. Metered through orifices, manometer rated on the two pipe lines, CO_2 percentage is indicated and the CO_2 gas is introduced into the water of the recarbonation basins through perforations in the pipes of the grids at the basin floors.

Three double sand filters, rated 2 gpm/sq ft each has the capacity of 1000 gpm. By opening a 20-in. slide gate, influent water is admitted to a special filter sand and rock bed having ceramic tile underdrain. The control is from a table which mounts a flow indicator, loss-of-head indicator and controls for a 16-in. hydraulic valve. The filter discharge is into a common effluent manifold. By reversing the flow, filters are cleaned as required.

Running from the domestic elevated tank to the double effluent piping of the filter beds, the backwash line is controlled by 16-in. hydraulic valves operated from the control tables; rates being set and indicated by valve. When washing, flow is reversed through the ceramic underdrains and sand bed, the water being carried off by troughs with adjustable lips for even skimming. Washings discharge through 24-in. square hydraulically-operated lift gates and are piped to a reclamation sump to settle, the clear water being pumped back for refiltering and the slurry being pumped to sludge beds.

The plant headhouse maintains laboratory equipment for water determinations as to residual chlorine, hardness, hydrogen-ion concentration, carbonate hardness, turbidity and suspended solids. Head house instruments define water levels in the No. 1 industrial cooling basin as well as rate and quantity of effluence from each hydrotreater, domestic supply pumps, and of water entering treatment. Float operated targets indicating reservoir levels are visible from the head house.

The hydrotreaters reduce suspended solids in the water to 10 ppm (parts per million) or less. Calcium oxide from 115 to 160 ppm is added to reduce carbonate hardness to 60 ppm. The ferric chloride solution or sodium aluminate induces coagulation. The hydrotreaters have the additional functions of mixing the chemicals with the water, the coagulant being a flocculent precipitate that tends to settle in the basins. They aid in distributing the floc through the water without disturbing it after settlement. They dispose of the settled material by means of blades on a revolving mechanism that squeegees the solids along the floor to a central pocket pumped out at regular intervals without completely removing the sludge blanket.

Parts Per Million

The chlorine residual, determined by the orthotiledine color comparison test in four hour intervals, is between 0.1 and 0.2 ppm in the domestic reservoir and 0.4 ppm in the industrial reservoir.

Copper sulphate additive is employed to supress algae growth. Approximately 4 lb per million gallon of copper sulphate applied in the flume ahead of each recarbonation basin.

CO_2 gas diffusion as described reacts with excess calcium hydroxide to reduce alkalinity and also converts carbonate ions into soluable bi-carbonates to prevent precipitation in the filter and distribution lines.

The water's pH concentration is tested before and after the carbonation basins and regulated for a pH from 7.5 to 8.5.

Average elevation in the mill area is about 1100 ft above sea level. Static water pressure naturally depends upon elevation. It varies somewhat. For example, when the elevated 250,000-gal tank is full, serviced by a 1000 gpm-40-hp direct-connected motor, the static pressure is 54 psi at the coke plant, 62 psi at the open hearths and 73 psi at the plate mill. Pressure on the domestic supply mains can be boosted to 100 psi whenever required by gasoline engine auxiliary pump having 2000 gpm capacity at 1250 rpm. The general fire system is supplied by the domestic system but the by-products area is serviced from the industrial system.

Two 5½-in diameter softeners provide

Truck-Crane Combination Has Dual Control Unit

Specially designed for bulk materials handling by contractors, railroads, industrial plants and others is the rubber-mounted two-motor crane illustrated below. A product of the company which in 1934 produced the first of the so-called self-propelled "wagon" cranes—Browning Crane & Shovel Co., Cleveland—this Tu-Control crane's special trait is to permit immediate transfer of traveling

and steering functions from the chauffeur's cab to the crane operator's cab.

The crane is operated from the chauffeur's cab at truck speed when traveling overland or through congested areas. Upon arrival at the job, where the crane operator requires full control over his machine, the truck functions are taken over by him through the Tu-Control mechanism, a device which permits this exchange. Hand and other signals are not necessary.

When on the job, the truck is moved forward, backward, and is turned by the crane operator. Truck engine is shut off. Precise control over the truck in relation to load on the boom is assured, according to the manufacturer. Where needed, travel and steering controls can be transferred back to the chauffeur's cab almost instantly. Browning Crane has applied for patents on the dual control mechanism.

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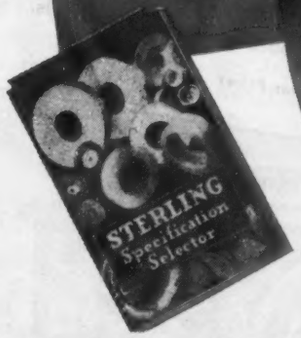

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THE STERLING GRINDING WHEEL DIVISION
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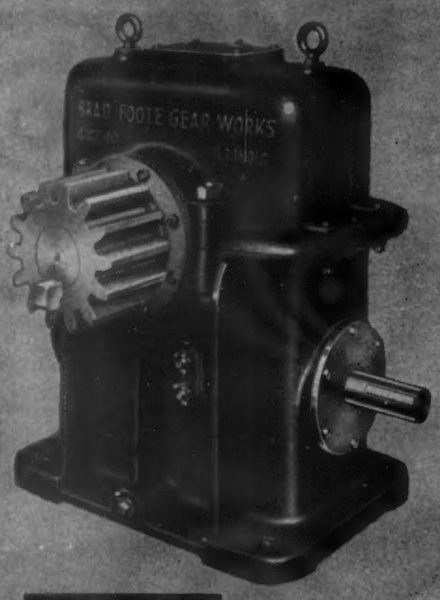
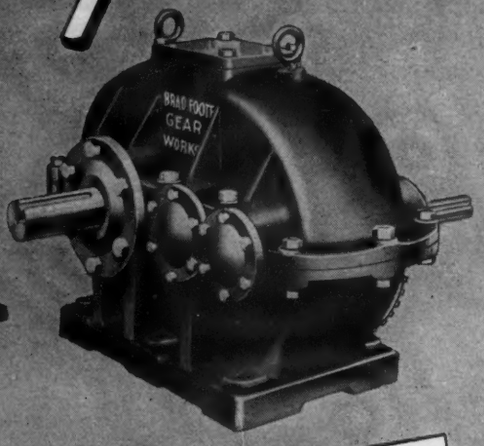
THE WHEELS OF INDUSTRY

Brad Foote Gears



Worm Gear
3⅝:1 to 60:1

Helical Gear Vertical
2:1 to 80:1



Herringbone Gear
2:1 to 295:1

Speed Reducers

2:1 to 30,000:1

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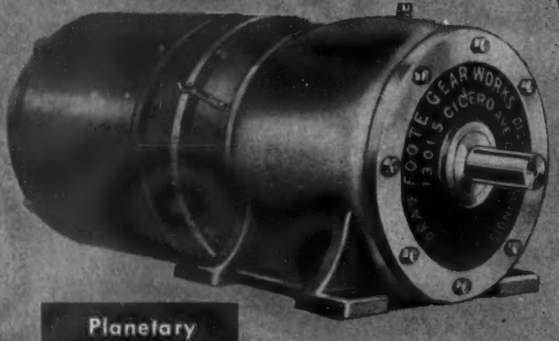
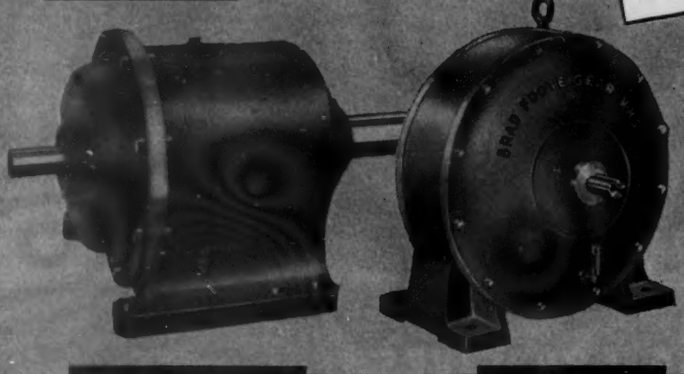
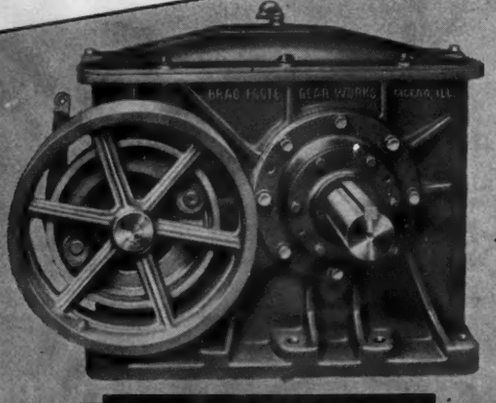


Planetary
4:1 to 400:1



Gyro
16:1 to 30,000:1

Spur
2:1 to 40:1



Oil Well Unit Little Giant
28:1

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zero hardness water for power plant boilers and the waste heat boilers at the open hearth. These each have a 200 gpm capacity supplied by the domestic system. Distinguishing coloring identifies the two systems of piping throughout the mills—domestic and industrial. Since the industrial water service is the most pertinent to this article, further briefing of the domestic setup will be stopped.

A 1,200,000 gal open reservoir at the water treatment plant is source of water for the industrial system. Make-up water for Nos. 1 and 3 cooling towers flow from it through two 18-in pipelines; one passing to the east of the blast furnace as emergency standby, and the other is the make-up line for the central cooling tower basin (No. 1) and for the steam plant cooling tower (No. 3); making either or both available by gravity to both basins. A junction weir box at the central cooling tower permits water to flow by gravity to cooling tower No. 3, since the power plant basin is at a higher elevation. Make-up from this tower is controlled by float valve, but manual slide gates control the flow to the central basin.

Supplies Are Joined

Make-up water is flumed into the cooling tower effluent trough, joining other water that has been cooled and is going to the industrial cold-well pumps. The cooled water is circulated through blast furnace, coke and by-products plants, sintering and open-hearth furnaces.

A parallel supply of water is some 700 gpm of cold water from the industrial reservoir directly to sprays for cooling coils at the ammonia and benzol by-product plants. A 25-hp vertical pump provides this service. It returns via the coke plant return line to the central cooling tower No. 1 Another small amount of make-up comes from steam plant blow-downs and from zeolite filter backwash which flows into the cooling tower basin.

Condensers, turboblower bearings and other utilities of the power plant are cooled by 12,000 gpm with make-up from the industrial system and circulated through cooling tower No. 3. The central industrial water service begins its circulation through cooling tower and the main pumping plant; supplying cooling to blast furnace, stove valves, sintering plant and raw materials area, coke and by-products plants, open-hearth furnace doors and frames and pig casting machine. This station supplies 700 gpm to flush electric precipitators and for lower ring gas washer spray. A pipeline standby exists at this station to serve rolling mill make-up water. Cooling tower basin, pumping plants, a 250,000 gal elevated tank, pipelines for distribution and return.

The main pumping plant has four 200-hp vertical electric pumps and two steam turbine driven horizontal centrifugal pumps, all taking suction from the sump connected to the cooling tower basin. The cooling tower pumping plant has four 50-hp vertical electric pumps which suction off the hot sump that catches the water return from blast furnace and coke plant. Another pumping plant, returning the open-hearth hot water to the cooling tower distributors, is serviced by three 20-hp vertical electrics.

Dual Pumping System

The 250,000 gal elevated tank is for pressure and storage with flat level marker and standpipe pressure gauge. It is serviced by four electric pumps, controlled by automatic switch, which maintain proper level through inlet pipe. Steam pumps are standbys, steam being supplied through separate power plant pipeline with an available gage pressure of 175 psi at all times; turbines and pumps being kept warmed up.

Other details of the industrial water service are open-hearth return water pumps which circulate the return cooling water through the distribution header of No. 1 cooling tower, controlled by water level switches in the return water sump. Two operate, and another is at rest; a selector switch controlling the working rotation. The central cooling towers are natural draft, each 18 ft 2 in wide, 27 ft 9 in high, 198 ft long with 15,200 gal capacity at initial water temperature of 106° and final of 88° F. The 6-ft cooling tower basin water depth provides 400,000 gal available for emergency, maintained constant by throttling discharge valves. Return water by gravity comes to the hot well of No. 1 cooling tower and recirculating pumps lift it to the distributing mains where it circulates at a rate to keep cold well temperatures within the 85 to 88° F range.

Approximately 3000 gpm is used for gas washing at the blast furnace and this dust laden water is sumped from which two 40-hp and one 15-hp pumps lift the water into a 90 ft diameter thickener.

The effluent from the thickener has 7 to 10 grains suspended solids per gallon and flows to a 50 ft hydrotreater to be conditioned and clarified. The hydrotreater effluent flows to a pump sump and is pumped into cooling tower No. 5 distributors by two 20-hp pumps (with one standby). The basin of this tower has a 100,000 gal capacity. The water thereafter flows to a cold well where pumps raise its pressure to 75 psi for use in the upper rings of the gas washer. Rate of pumpage varies between 2400 and 3000 gpm. The excess returns to the central cooling basin.

Two industrial water services are provided in the structural-merchant mills; one for the three motor rooms and the other for cooling rolls and general use. The first is circulated through cooling tower 2A and losses are made up from the No. 1 industrial system. Roll cooling water is circulated through tower No. 2B and receives its make-up also from No. 1 industrial system.

Motor room service is closed circuit; pumped through supply lines into motor room heat exchanger cooling coils and under return line pressure sufficient to get it back to the cooling tower with lines and coil friction allowances. The motor room cooling tower is a natural draft 7600 gpm, initial 97° and final 85° F temperature, wet bulb 70° F wind 1 mph. Its basin has 200,000 gal capacity. Three 100-hp and one 75-hp pumps provide circulation in controlled temperature relays, rotation being automatic by selector valve.

Four Pumps Service Mill

Mill service provides water for roll cooling, descaling, bearing cooling with pressure provided by four 100-hp pumps, regulated by elevated tank. Water is collected in trenches after roll cooling and descaling, and is then carried to scale pits.

After the mill scale has settled out, the water containing oil and suspended solids flows over a weir into a pump sump, then into clarifloculators and on to the cooling towers. The mill service cooling tower is likewise a natural draft 9000 gpm., initial 106° and final 88° F temperature, wet bulb 70° F, wind 1 mph. The basin serving this tower has 250,000 gal storage capacity.

Mill service is facilitated with a 100,000 gal steel elevated tank at El. 1203 ft high water level. It controls the mill service pumping and absorbs the shock of starting the pumps.

Five 50-hp scale pit pumps provide suction at the plate mill scale pit sump. Each has a 2-way discharge; one to the scale flushing line and the other to the return water line, permitting wide range of pumping and regulation. There are also two clarifloculators (70 and 90 ft diameter) in the mill service system; this apparatus including a circular steel baffle dividing the concrete tank into inner circular as well as outer annular compartments.

The dirty returned water enters the inner compartment via the influent flume. The overflow is over the launder and continuous around the outer compartment. Settled solids are removed from a trap at center, to which they are squeegeed across the floor, and from which they are pumped. Sludge disposal is by pumping to nearby drying beds.

Another article to come will deal with emergency operation of its water service and with its sewage treatment plant.

Tool Engineering

(*Concluded from Page 85*)

pendent control of size. Dual wheelslide arrangement has been applied to the field of grinding bearings on camshafts and crankshafts, and is also being applied to the grinding of crankpins where the design of the crankshaft places two pins in line. Such machines now are specially designed for production requirements and embody many automatic or functional features designed to facilitate ease of operation.

Under some conditions it may be practical to apply several wheels on each wheelhead unit of the twin wheelslide type machine. One such setup is shown in Fig. 3. The nature of the part to be ground establishes this possibility since the limitations of multiple wheel single mount characteristics must also be considered for each of the two wheelhead units.

There is a considerable trend toward the use of sizing devices on grinding machines. Visual or indicating types of gages have been used extensively. Considerable effort is being made and satisfactory results are being attained in the use of gages which embody electric control principles. These permit the grinding gage to control the grinding cycle and the size of the work. This particular technique holds promise for satisfactory and widespread future application.

Wheel forming by crushing is a practice which originated a number of years ago, but has only recently been widely accepted as an efficient means of shaping the grinding wheel face. It is proving to be highly desirable where forms are involved and where plunge cut grinding is used. This method now is developing fast.

Fig. 3 shows a few of the many wheel forming rolls now successfully used on production work. One of these—the second from the left in Fig. 3—is shown by Fig. 4 in the act of transferring its pattern in reverse to the face of a wheel which in turn will reproduce the roll shape in the work pieces. When being dressed in this manner, the wheel is rotated slowly by means of an auxiliary driving means, and the forming roll is slowly forced into the wheel—the two of course revolving together.

Many of the early stumbling blocks have been removed and the program has gained a momentum indicating that the practice of crush dressing may have a distinct effect on machine design and on material and wheel selection. It is reasonable to believe that anyone interested in the field of grinding must be alert to the development of crush forming. These developments are in a fluid stage at the present. Therefore, no concise statements will be made here.

Grinding coolants long have been the subject of considerable thought and research. They serve the purpose of removing heat and at the same time of lubricating the cut as well as protecting the surface of the part being ground.

There has been great advancement in the use of oils. Under some conditions oil has proved to be the key to the successful application of a grinding machine.

Not only must coolant function in the capacities previously mentioned, but it is highly desirable that it also have the faculty of permitting the removed stock and abrasive to be easily separated in the coolant reservoir.

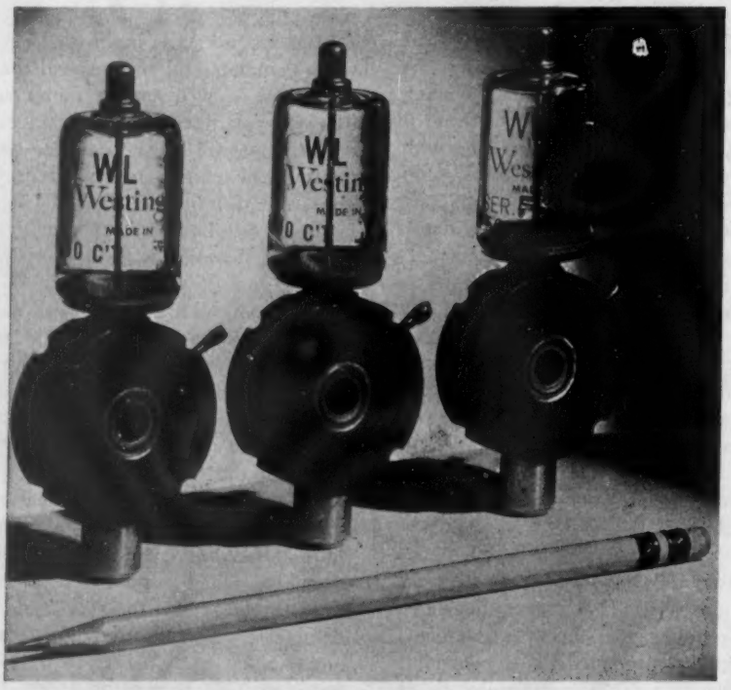
Coolant Planning Vital

A typical example of the application of a compounded coolant to an exacting job, is given by the action picture of the spindle grinding job presented herewith as Fig. 5. Generous flow of clean liquid through a properly shaped and properly located nozzle is a "must" on a setup of this kind.

It is interesting to observe that a considerable amount of development is being carefully analyzed and supervised by a large number of manufacturers of lubricants in co-operation with grinding machine users and manufacturers. Undoubtedly many articles will be written on this subject as the results of these developments show definite promise.

It can be expected that the future will bring forth greater economy in wheel life, improved finish, and faster cutting time through the improvements and developments of coolants and lubricants for grinding.

Summarizing this brief examination one is convinced that the art of grinding and the field of development in the use of the grinding wheels and grinding machines, as old as it is, still has many challenges ahead of it and that it can be expected that new methods, practice, and economies can be anticipated. These will be developed by the co-ordination of the efforts of the machine manufacturer, the wheel manufacturer, process engineers, and users of grinding machines.



QUICK SWITCH: A switch that operates in 1 millionth of a second, while the pulse transmitter and echo receiver of a radar set, using the same antenna, alternate between sending and receiving at rate of 1000 times per second, has been revealed by Westinghouse. Speed is essential in switching so that nearby reflections (potentially most dangerous) will not be missed. In the "TR box"—a needle spark gap in a confined space containing gas at a definite pressure—high voltage of pulse from transmitter causes gap to spill over, short-circuiting receiver. At end of pulse low pressure gas chamber quickly deionizes, preparing receiver for return wave. Presence of ions is assured by a separate discharge maintained within the hermetically sealed chamber, and a large glass reservoir at top replaces gas lost through adsorption

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Steel Wool

(*Concluded from Page 87*)

than softening effect on steel, but in steel wool shaving it is understood that the tougher and harder higher manganese steel fibers split off more readily ahead of the cutting tool.

Higher manganese steel has a more homogeneous microstructure with less banding and more uniform distribution of carbides. Fiber diameters in finer grades of wool approach microscopic dimensions, and a more homogenous microstructure may well produce a more uniform fiber. Molybdenum and chromium up to about 0.5 per cent, separately or together, in general give similar improved effect to wool steel wire and apparently for the same reason as the higher manganese ranges.

Fibers are of polygonal cross-section, usually triangular, with three or more sharp edges. Abrasive characteristics of steel wool vary with the size of the fiber, readily controlled in manufacture, and then classified into seven grades.

Basically, steel wool is produced by cutting wire with serrated knives or cutting tools at fixed points. (See diagram, Fig. 4.). Most machines are of the shave-block type, cutting horizontally up to seven grades or sizes from the same wire. The larger sizes produced are from initial cuts, with chips becoming smaller in size as material is shaved from the wire. In the drum-type machine, wire does not move through a track or guide, but is held as a loop around a wheel and, to all practical purposes, is an integral part of the machine itself as wire synchronically contacts the cutters.

Most critical point in manufacture is the point where the edge of the cutting tool contacts the moving wire. Absolute control here is essential to get uniform fibers. Teeth on some cutting tools are invisible to the eye. Tools are held in position by automatic microadjusted holders of special design. Cutting machines are of special individual design and no machine builder produces a standard line of steel-wool cutting or shaving machinery.

Steel wool is graded according to size. The largest diameter fibers are approximately 0.0080-in. and the smallest 0.0018-in. Within those sizes there are seven grades. Numerous attempts to use material other than wire have been commercially unsuccessful, although metal wool is produced by the same process from stainless steel, copper, nickel, brass, lead and aluminum having the same general characteristics.

Six manufacturers produce all of the steel wool made in this country, the product long accepted by the housewife as a kitchen cleaner, but actually first used by industry. There is an increasing use of steel wool for industrial purpose, notably for de-burring. During the war, large quantities were employed as camouflage material. Although relatively few firms manufacture steel wool, the industry is highly competitive.

Steel wool also is used in mechanical operations to speed production and increase the efficiency of operation. A large number of manufacturers use steel wool arbors or spindles for removing burrs from nonferrous metals and laminated plastics. By changing the grade of the steel wool they can use the same spindle for special polishing and cleaning operations. Because of its flexibility and ability to follow almost any contours, it can be used on difficult jobs where odd shapes or designs are involved.

Steel Wool Laundry Pad

Laundry machine manufacturers have developed a steel wool laundry pad that is resilient and possesses the long-lasting qualities which were needed in their machinery. Research is now being undertaken on other types of laundry pads and cushions. For many years it was known that steel wool properly applied would make an excellent filter.

When Army specialists were developing filters for field-kitchen stoves, they were looking primarily for something to remove lead from the gasoline which fires these stoves. Steel wool was found to be the answer. Other fields are in oil refineries and water softening plants and in public utilities, where steel wool is used to filter gases. Throwaway filters are also made of steel wool. The increasing demand for air conditioning units opens up a still larger field for the product.

Steel wool is not a new item or even one that had its birth in this country. Its origin dates back about 200 years when two pioneers of electrical science used in their experiments an abrasive substance called "metallic shavings" to remove rust and tarnish from metals which they were fabricating.

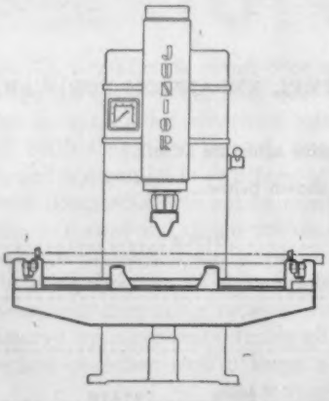
Straightening Fixture

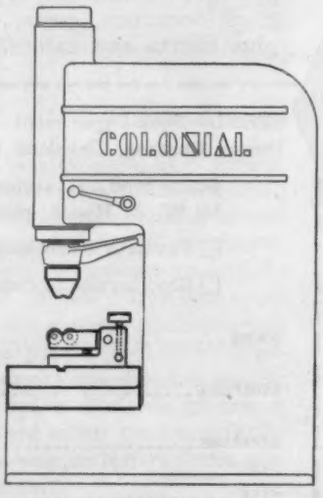
Additional equipment permits hydraulic broaching and assembly presses to be used for straightening operations

ADDITIONAL equipment enables hydraulic broaching and assembly presses to be used interchangeably and also for straightening operations. Changeover from assembly or broaching jobs to straightening work is accomplished by placing in the platen of the machine a self-contained, single-unit roller type straightening fixture, as sketched in position on press.

Fixture extends out beyond the platen to left and right in order to provide ample support for work pieces considerably longer than the width of the standard machine platen. Machine operation is hydraulic, with infinitely variable ram speed and pressure controls, if desired. Machines will be found most useful for straightening work on small diameter parts.

Means are provided for solidly bolting the fixture to the platen of the press, but such attachment usually is not necessary as fixture design provides balanced operating load on the vertical centerline of the machine and fixture. Straightening fixture, manufactured by Colonial Broach Co., Detroit, is available for all sizes of the company's Junior presses, ranging from 1 to 4 tons capacity, for use on bench type model or on base type.





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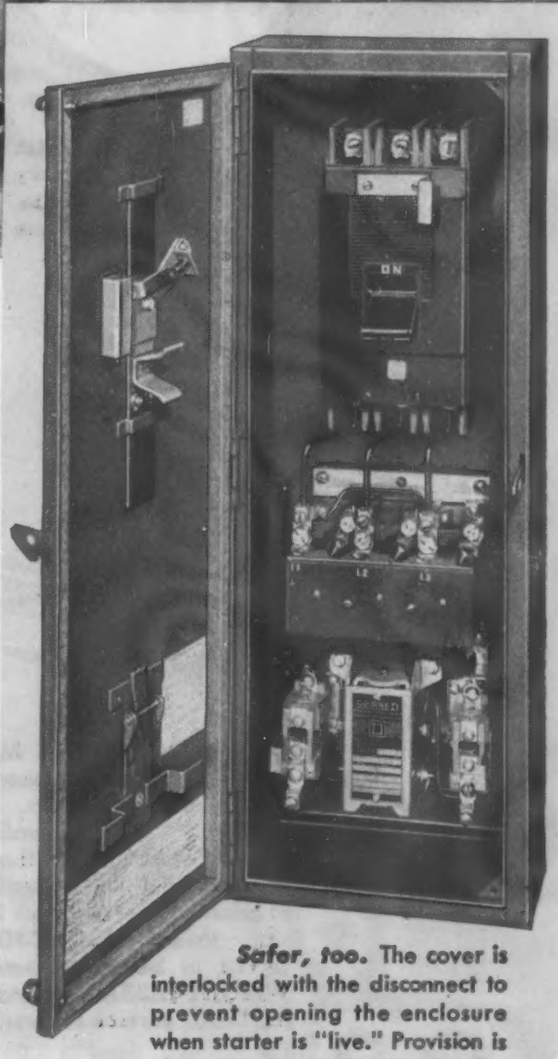

Safer, too. **The cover is interlocked with the disconnect to prevent opening the enclosure when starter is "live." Provision is also made for padlocking the disconnect in the "OFF" position.**

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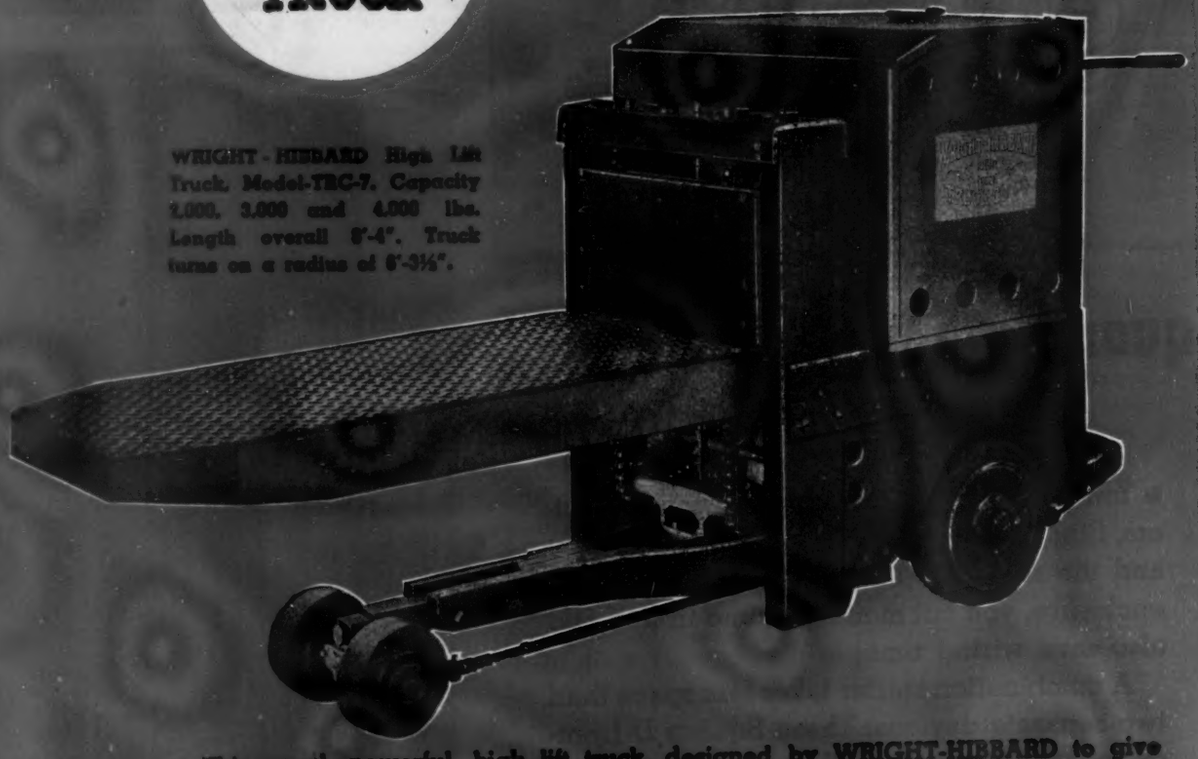

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INDUSTRIAL ELECTRIC TRUCK CO.

INCORPORATED

PHELPS, NEW YORK

Atomic Structure

(*Concluded from Page 89*)

x-rays passes through a slit system and falls on the specimen, from which a number of cones of diffracted beams diverge. Each cone gives rise to a line on either side of the center of the film, and the appearance of the strips of film when laid flat is shown in Fig. 3. Any crystalline material is built up of a very large number of three-dimensional units of pattern, or unit cells; the arrangement of the lines on the film tells us about the size and shape of this unit cell, and the relative intensities of the lines tell us about the atomic pattern in a single unit cell[2]. In this way we can obtain the desired information about structure of phases.

The difficulty with iron-carbon alloys is that carbon atoms, besides being fewer in number than the iron atoms, also have a smaller effect on the intensities of the diffracted beams and very careful experimental work and refined technique are required to determine the positions of the carbon atoms.

It is possible to represent the phases present in different iron-carbon alloys under equilibrium conditions at various temperatures on what is known as an equilibrium diagram. This diagram, determined by the microscope and x-rays and other methods, is shown in Fig. 4[3].

Taking an alloy of a particular composition, indicated by the point X, the phase changes that takes place as it is heated are represented by the vertical line XY. In the region A it consists of a mixture of two phases known as ferrite and cementite; in the region B it is a mixture of austenite and cementite, and in C it has become pure austenite; in the region D it is a mixture of austenite and liquid, and in E it has all liquefied. Thus there are the three phases—ferrite, cementite and austenite—whose structure must be investigated, and besides there is the phase of great importance known as martensite, which cannot be shown on this diagram, as it is formed by very rapid cooling from the austenitic region, and is not present under equilibrium conditions.

In the ferrite phase, the iron atoms are at the corners and centers of a cube. Since pure iron in this form only dissolves up to 0.006 per cent carbon, the position of the carbon atoms has little significance. Martensite is shown in Fig. 1; the unit cell is no longer cubic[4], but has been distorted along one axis, the distortion varying linearly with carbon content. Possible positions for the carbon atoms are shown by black dots, although, at most, only one-twelfth of them are occupied. The iron atoms are not exactly at the corners and center of the cell but may occupy a range of positions, the actual position depending on the proximity of a carbon atom. Martensite can be regarded as ferrite supersaturated with carbon. X-ray photographs are too poor to show the position of the carbon atoms directly, but they do show the displacement of the iron atoms, and from this the carbon atom positions are inferred.

The iron atoms in austenite are at the corners and centers of the faces of a unit cube, as in Fig. 2. It is just possible to detect the carbon atoms by extremely careful estimation of line intensities, and the observed positions are shown, though as before only a few will be occupied[5].

Cementite, unlike the above mentioned phases, is very similar to a chemical compound, for it has a very small range of composition. The unit cell has three edges all mutually perpendicular, but all of different lengths. The method used to detect the carbon atoms was that of Fourier analysis[6].

REFERENCES

[1]W. L. Bragg, "The Crystalline State", Vol. 1,33; Bell & Sons, 1933.
[2]W. L. Bragg, loc. cit. 90.
[3]R. S. Archer, Metals Handbook, 366, Amer. Soc. for Metals, 1939.
[4]H. Lipson and A. M. B. Parker, Journal Iron Steel Inst., I, 123, 1944.
[5]N. J. Petch, Journal Iron Steel Inst., I, III, 1942.
[6]H. Lipson and N. J. Petch, Journal Iron Steel Inst., II, 95, 1940.

Portable Hardness Tester

A portable hardness testing hammer, Type P, making practical the taking of a hardness test at the location of the material is available for occasions not requiring a scientifically accurate test of the material but only the hardness in regard to workability.

If material of a certain degree of hardness is to be selected it is only necessary to see whether the diameter of the impression made corresponds to the desired degree of hardness. The impression is checked with a microscope and chart which accompany the instrument illustrated.

The hammer consists of a cylindrical housing and easy moving piston; the housing is closed on one end with an inside thread cover, and on the other end with an open bushing. Between the cover and the piston, a strong spring is located which presses the piston against the bushing. The piston is coupled with a striking piston, which projects through the bore of the bushing guided by an airtight fitting ring in the cylinder and carrying a steel ball on the end.

By resting the hammer with the ball against the material to be tested and pressing on the operating end, the striking piston and the piston in the housing moves inward and presses against the spring between the piston and the cover. At a certain point in this movement, the coupling between the piston and striking bolt is released, so that the piston, under pressure of the spring, moves against the inner end of the striking bolt and the ball impresses the material to be tested. After the hammer is released, the striking bolt is brought back to its former position by spring in cylinder.

Testing hammer is a product of Steel City Testing Laboratory, 8843 Livernois, Detroit 4.

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The Dempster-Dumpster is not an ordinary materials-handling-by-truck operation. The Dempster-Dumpster is a unit—made in several types and sizes—mountable on any truck chassis, for hoisting, placing in carrying position, and dumping any one of dozens of different types of Dempster-Dumpster bodies for handling every conceivable character of material. When installed on your truck chassis, this one unit will serve any number of bodies your operation may require. Some plants are using a single Dempster-Dumpster unit to serve 50 to 75 bodies. In certain cases several types of bodies, for various types of materials, are used, and all served by a single Dempster-Dumpster.

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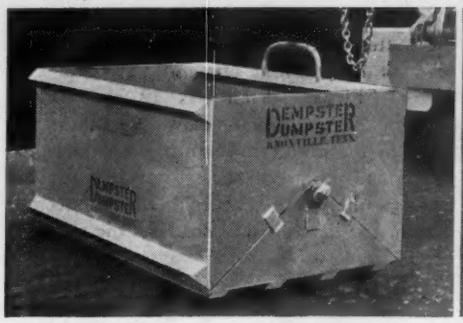
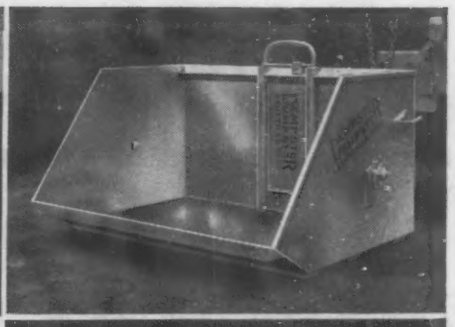
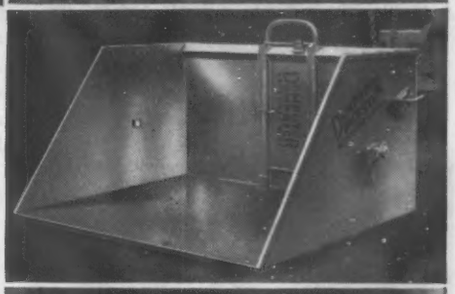
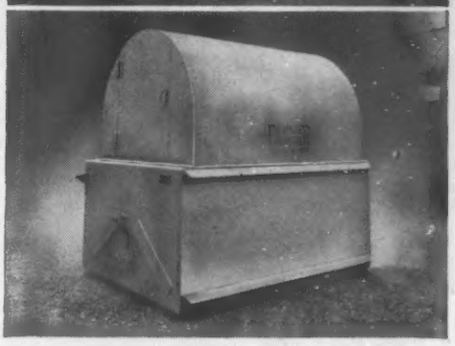




DEMPSTER DUMPSTER REGULAR BODIES

★ Shown above and at right, photos 1 through 5 inclusive, are five of our "regular" Dempster-Dumpster bodies. These are basic designs from which hundreds of variations, so-called "special" designs, are produced to meet the particular requirements of any materials handling problem. These "regular" bodies, in order, are: 1—Bottom dumping, 2—Tilt-type, 3—Skip-type with lip, 4—Skip-type flat bottom and, 5—Apartment-type for bulky materials, trash, or rubbish. These bodies are built in from 1½ to 10 cu. yd. sizes or 1½ to 7½ tons pay load capacities.

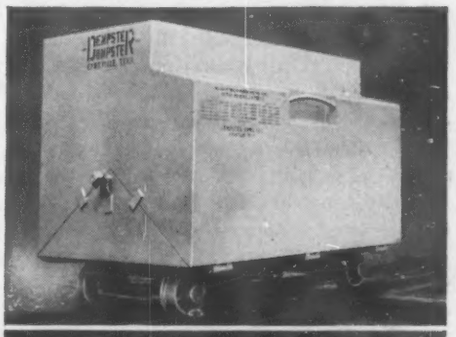


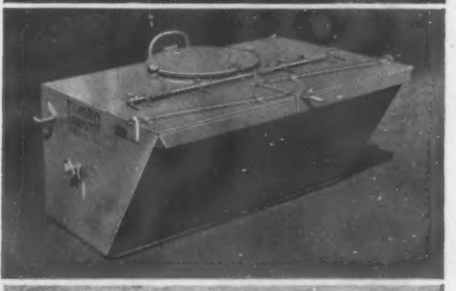


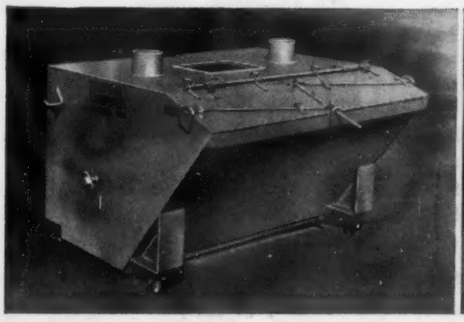
DEMPSTER DUMPSTER "SPECIAL" BODIES

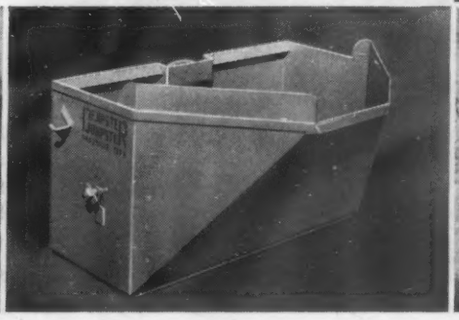
★ Shown in photos 6 through 10 inclusive are five examples of "special" bodies, now serving some of the nation's largest industrial plants. Note in No. 6 that precision bearing, flanged car wheels have been adapted to a bottom dumping body. Wheels remain on body when picked up by Dempster-Dumpster for further transportation and dumping. Photo No. 7 shows a Tilt-type body developed for handling a semi-liquid material. No. 8 for handling dust collection. No. 9 for moulding sand. No. 10 for a finely ground material and having swivel casters for easy maneuverability in plant. Hot materials up to 1700° F are being handled by the Dempster-Dumpster, finished and unfinished products, light, heavy and liquid materials as well.

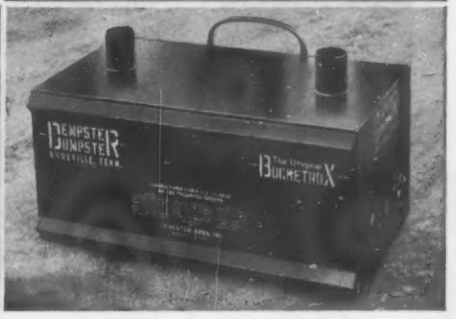
If you have any idea the Dempster-Dumpster may be adapted to your use to advantage, our engineers will gladly go over the matter with you. Write for our new Catalog No. 245 now. Dempster Brothers, Inc., Knoxville 17, Tennessee, U. S. A.









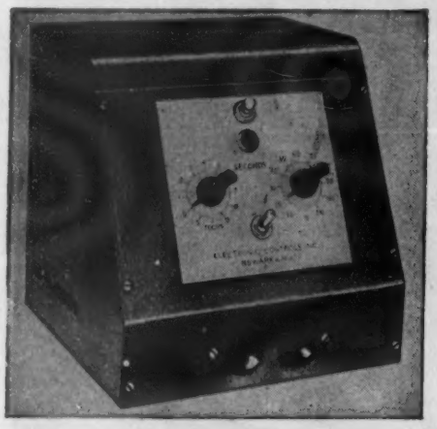


INDUSTRIAL EQUIPMENT

Electronic Interval Timer

Electronic Controls Inc., 44 Summer avenue, Newark 4, N. J. announces a new electronic timer suitable for all applications requiring highly accurate circuit timing.

Time range is from 1 to 120 sec in increments of 1 sec. Unit is housed in



a slope front steel cabinet with attractive crackle finish. Two dials are provided for time selection. One dial is calibrated in single seconds; the other in 10 sec steps. Dials control tap switches. A pilot light, toggle on-off switch and a push-switch are included.

A double receptacle permits timing two circuits simultaneously. Contacts are normally wired SPDT with double break and are rated at 25 amp 32 v dc, 25 amp 125 v ac and 10 amp 230 v ac. Contacts on this interval timer can be wired DPDT at correspondingly lower rating.

Cabinet size is 8 x 8 x 8 in. Tube used is a 2050 thyratron. High accuracy resistors assure precise timing and timing is independent of the length of time the tripping pushbutton is depressed. Dial switch is provided with a position for continuous circuit closure. The unit is compact, easy to operate and is supplied for 115 v ac operation.

The timer is recommended for all photographic and industrial applications requiring precise time control.

Steel 2/25/46; *Item No.* 9028

Collets and Fingers

General Die & Stamping Co., 262-272 Mott street, New York 12, announces the addition of a new series to its line of Precision collets and feed fingers, to fit Brown & Sharpe machines. The popular No. 00 and No. 10 collets and fingers are now available for immediate delivery in all round sizes in 64th-in. steps. These collets and fingers are manufactured from a specially developed tool steel.

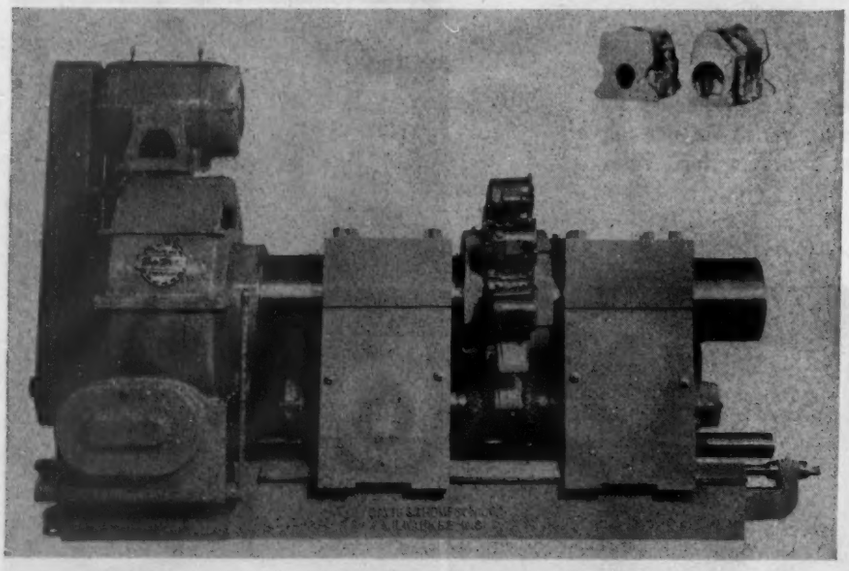
Steel 2/25/46; *Item No.* 9002

Milling Machine

Design of a new machine by Davis & Thompson Co., 6411 West Burnham street, Milwaukee 14, provides for continous milling of the parallel faces of transmission cases. Work pieces are automatically clamped and located. Rotation of work drum passes work through the roughing cutters and through the finishing cutters successively. After a rotation of work drum milling operations are completed. Fixture drum has 12 stations insuring a continuous flow of pieces through the cutters. To insure accuracy micrometer adjustment is provided for each spindle which is accessible from outside of the heads. Both heads of the machine are movable on the ways providing flexibility of range. Speeds and feeds are controlled through change gears.

Machine is of rigid construction insuring close tolerances and freedom from chatter. Gross production of this machine is 126 per hour. Weight 26,300 lb.

Steel 2/25/46; *Item No.* 9025



Geared Motor

Jack & Heintz, Inc., 17600 Broadway, Cleveland 1, announces first of a group of new lightweight continuous duty geared electric motors. These units are being made available in sizes ranging upward from 1 hp. Although originally designed as aircraft pump motors, they are adaptable for many other similar applications in various sizes adequate to cover a wide field.

Model JH-13100 motor (illustrated), designed for 28-dc systems, is rated for continuous duty at 3 hp with a speed of 3800 rpm at the splined output shaft. This compact self-cooled unit, developed to operate efficiently at 40,000 ft altitude, weighs 19½ lb and occupies a cylindrical space approximately 6 in. by 10½ in.

Electrical connector is AN type; drive and mounting flange is standard AND 10001-D2, and cradle support optionally employs same mounting belt hole spacing.

Steel 2/25/46; *Item No.* 9035

Light Source

Cold cathode electron tubes with two internal trigger grids for operation in simple condenser discharge circuits are available from Sylvania Electric Products Inc., Salem, Mass. Used as a source of stroboscopic light, these strobotron tubes provide pulse frequencies up to 240 pps. Applications include printing from high-

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 186.)

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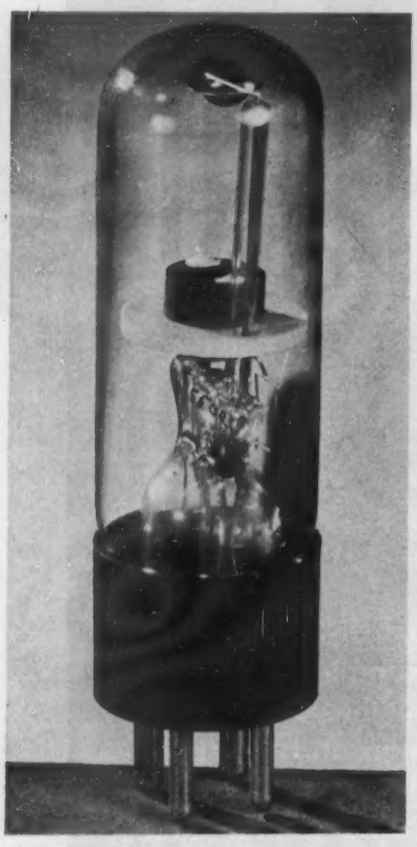
speed rotary presses; precise timing of cams, shafts, flywheels, gears, pulleys, fan blades, spindles and shuttles and many other rotating or reciprocating parts. Strobotrons also make visual study of stress or effect during operation in actual service easy by creating "stop," reverse or slow motion which may be photographed for reference or permanent record. Frequency of flashing may be read-



ily controlled and calibrated over wide limits to produce a compact direct reading instrument.

Standard strobotrons measure 4 9/32 in. overall, including T-9 bulb and a 4-pin base, 1 3/16 in. in diameter. Fifty milliamperes average current, with 350 v dc on the anode permit instantaneous surges of 5 amp. Grids are operated at 70 v dc and 15 milliamperes maximum. There is a drop of 75 v during glow discharge and a 20 v drop during arc discharge. Starting is initiated by discharge between any two elements.

Steel 2/25/46; *Item No.* 9980

Strainer

A Y Strainer has been designed with a snug fitting strainer sleeve unit to assure trouble free operation, by J. A. Zurn Mfg. Co., Erie, Pa. This strainer sleeve is removable but it is designed so that it cannot get out of place or vibrate when in use, which enables the unit to be installed in almost any position on a pipeline. When service conditions require it, strainer basket is magnetized for intercepting metal particles that are

ruinous to valve seats and vital parts of operating pipeline equipment.

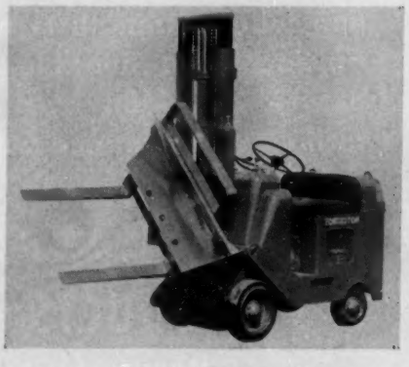
All units are hydrostatically tested according to service pressures under which they will be required to operate. They are available with or without a cleanout plug, or can be furnished with a threaded blow-off connection.

The device is manufactured in cast bronze, steel, semisteel or cast iron, depending upon the conditions to which it is subjected. A wide range of sizes is available for flanged, welded or threaded connections.

Steel 2/25/46; *Item No.* 9014

Lift Truck Accessory

A new lift truck accessory, designed for the paper industry, but suitable for use in any handling operation requiring movement of cylindrical loads in either vertical or horizontal position is announced by

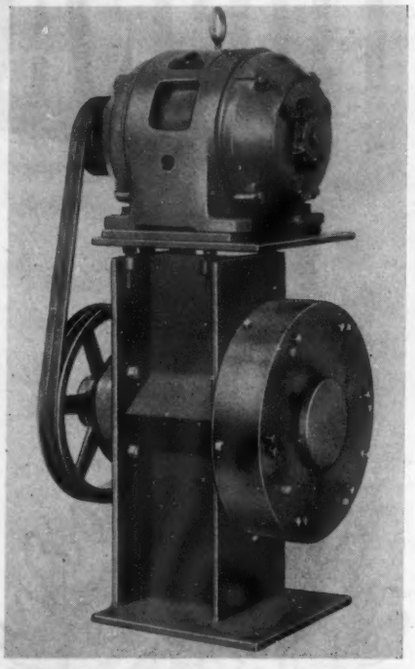


Towmotor Corp., 1226 East 152 street, Cleveland. Designated the Upender, it is designed to turn or "up-end" rolls of paper from vertical to horizontal position or vice versa. This accessory is designed for simple operation and is constructed of steel bars and angles. It has two carriages: (1) A regular elevating carriage mounted on the mast and (2) a revolving, or up-ending carriage. A tapered blade of steel, combined with a curved plate bolted to carriage is standard attachment for picking up rolls of paper on end. A pair of regular Towmotor forks is used for picking up, carrying and stacking horizontal rolls and acts as a backrest to stabilize rolls in vertical position. If preferred, a full apron, with steel blade, can be provided in place of the standard combination of curved plate, blade and forks.

Steel 2/25/46; *Item No.* 9026

Booster Pump

A high pressure booster pump that solves the problem of too much "downtime" for repairs, is now available, according to Martin Wells, Los Angeles. This pump provides dependable and con-



tinuous service with high pressure oil operated machines, such as presses for plastics, rubber, drawing, coining, and bending. Positive displacement — no slippage. Model No. 6 pictured here, delivers 6 qt of oil per minute at 5000 lb line pressure. It requires 4 sq ft for installation, weighs 300 lb, stands 23 in high. It is available in other sizes up to 24 qt.

Steel 2/25/46; *Item No.* 9003

Hydraulic Press

A wide variety of pressing, straightening, bending, flattening, assembling and other operations can be performed on the 25-ton hydraulic press announced by Mech-Art Products Corp., York, Pa. Press is self-contained, thus it can be located in the most convenient place and moved about at will. Power is applied by hand

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 136.)

"You save the cost of the hole..."

This hydraulic cylinder *could* be hogged out of bar stock, but tubing does the job with less waste, at less cost—because the "hole" is there to start with. This basic advantage of steel tubing is obvious enough to be often overlooked.

Thousands of mechanical parts are made faster, easier and cheaper with steel tubing —and tubing is just as easy to get as to use. In carbon mechanical grades alone, Frasse stocks a size range from 3/32" to 10" O.D.... for immediate shipment...in a wide variety of convenient wall thicknesses.

If you use alloy or stainless tubing, Frasse has it just as handy. Frasse stainless inventories include types 304, 316 and 347 in broad, size ranges, and alloy stocks include NE 8630 and AISI 4130. Pipe sizes, too, are immediately available in both stainless and carbon grades.

Frasse has long specialized in the distribution and development of steel tubing. Backed by over 45 years experience in tubing and its uses, Frasse counsel is freely available on your production or procurement problems. Call us.

Peter A. Frasse and Co., Inc., 50 Exchange St., Buffalo 3, N. Y. (Wash. 2000) · Temple Bldg., Rochester 4, N. Y. (Stone 840) · State Tower Bldg., Syracuse 2, N. Y. (Syracuse 2-1373) · New York, N. Y. · Jersey City, N. J. Hartford, Conn. · Philadelphia, Pa. · Baltimore, Md.

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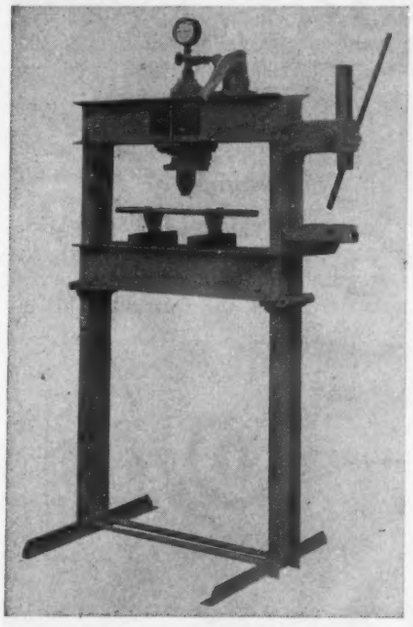
From the pages of American business papers—*like the one you are reading now*—you have learned much to help you through the trying days of war. From these pages you can now learn much that will help you make the transition from war back to peace with the least loss of time, effort and profit.

Your business paper editor is your experienced counsel. He knows your problems. Discuss them with him. It is his business to help you solve them. Read your business paper regularly and carefully because the business paper reader is a better business man.

One of a series of messages prepared by the Business and Industry Department of St. Joseph's of Indiana, college for men, at Collegeville, Indiana.

operation and eight strokes of the pump equal 1 in. of ram travel which results in fast press action.

Press cylinder is a steel casting of maximum strength. Table is supported by two alloy steel pins which rest in four inverted V-bearings. Handle grips at end of table make possible immediate adjust-

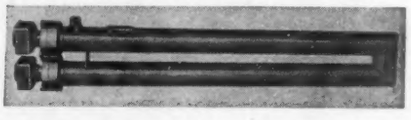


ment in the height of table to handle various size work. Distance between uprights is 30 in., to handle long shafts. Table travel is 35 in., ram travel is 4½ in., ram diameter is 2¾ in., width between table channels is 5⅛ in. Overall height is 60 in. and floor space required, 34 x 27½ in. Weight, 420 lb, with arbor press.

Steel 2/25/46; *Item No.* 9008

Electrical Heat Exchanger

Brown Fintube Co., Elyria, O. introduces a new heat exchanger that employs electrical resistors as the heat source. Electrical resistors are encased inside a length of standard Brownweld



fintube. Current density of typical resistors now in use is 4 kw per linear foot of fintube.

Notwithstanding this high rating on interior of the fintube, rating on the outside surface (due to large ratio of exterior to interior area of the fintube) is only about 8 w per square inch, thus avoiding high skin temperatures that might cause carbonization of heat sensitive materials.

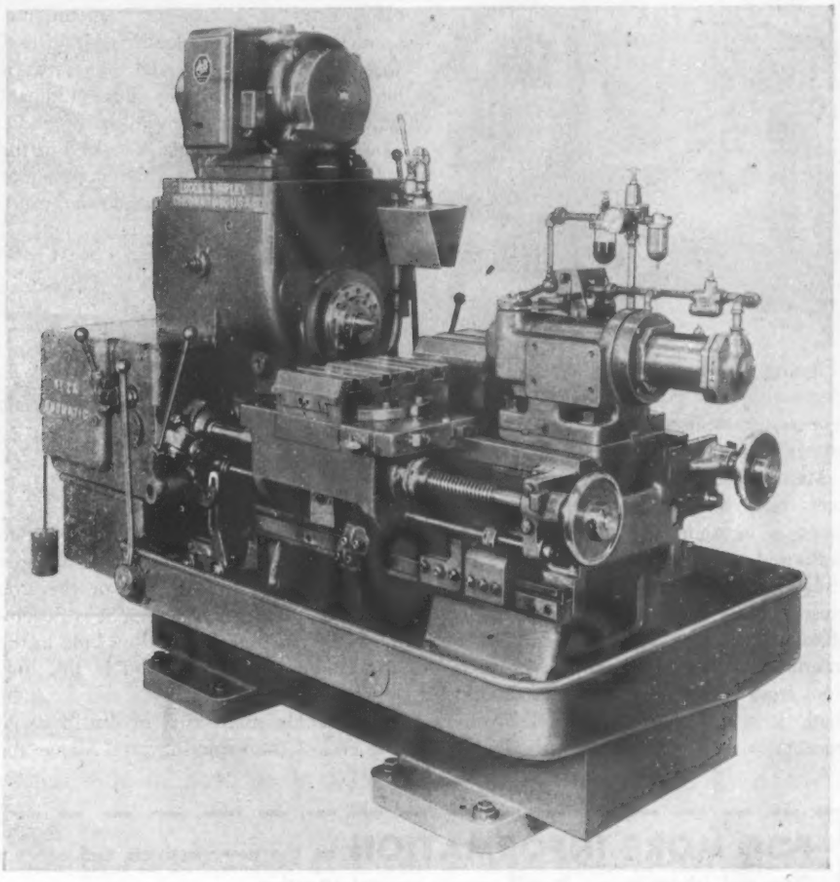
Units are recommended when steam is not available, when it is desired to eliminate the auxiliary piping required when steam is used, or to heat the fluid to higher temperatures than can be reached with steam.

Steel 2/25/46; *Item No.* 9052

Automatic Lathe

An automatic lathe, 2A Duomatic, has been developed for improved production of small jobs by Lodge & Shipley Machine Tool Co., 3085 Colerain avenue, Cincinnati 25.

The 2A provides full automatic handling of small work, yet it retains all the features of the bigger, more powerful



3A built by company. More effective use of multiple tools in turning, and straight and angular facing operations is made possible. The tool is specially designed for quantity production of lathe work arranged between centers, on an arbor, or in suitable chucks or fixtures, yet is equally adaptable to efficient handling of small runs.

There is a complete front carriage and tool slide, and complete rear carriage and tool slide, each independently actuated from its own feed screw. As a result, the 2A, for all practical purposes, is like two lathes in one. Feed and traverse mechanism provides rapid forward and return traverse, a wide range of mechanical feeds from pick-off gears, pause adjustment, and graduated dial for determining length of power forward traverse. Provision is made for disengaging power feed whenever necessary during the cycle to return tools to start. Separate clutch lever enables operator to manually set up required cycles through rotation of hand wheel at tailstock end of each feed screw. Control levers enable operator to start spindle and cycles independently from front or rear, or simultaneously from the front. All setups are mechanical, no cams are required to change cycles.

Tool slides can be swiveled to any angle on graduated tool slide base. Wide, double wall bed with elliptical girths assures utmost rigidity. Automatic lubrication covers headstock, driving pulley and feed and control mechanism. Other features are: Heavy-duty tailstock with built-in revolving center; graduated dial adjustment for determining amount of power forward traverse; pause at end of cut; stopping of spindle during cycle stops both carriage and tool slide travel.

Specifications are: Swing over bed 20¾ in. Swing over front or rear cross slide 9½ in. Distance between centers, base length of machine 15 in. Center distance can be increased in increments

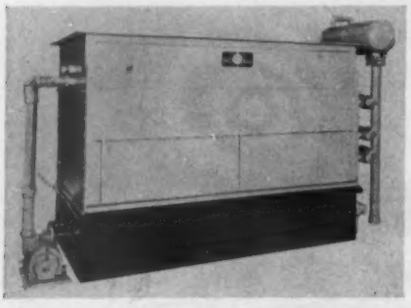
(All claims are those of respective manufacturers; for additional information fill in and return the coupon on page 136.)

of 6 in. up to 27 in., and 12 in. beyond 27 in. Hole through spindle is 2⅛ in. Range of feeds 0.003-in. to 0.050-in. Range of spindle speeds, dependent upon change of gears and driving pulley selected is 50 to 2000 rpm. Motors are 5 to 20 hp.

Steel 2/25/46; *Item No.* 9903

Liquid Cooler

The new industrial liquid cooler introduced by Niagara Blower Co., 6 East 45th street, New York 17, provides refrigerated cooling water or any aqueous solution for industrial uses, specially the cooling of water to the lowest possible temperature above freezing for air con-



ditioning or water cooling jackets, or in chemical, photographic and industrial process, or as used in milk plants, bakeries and other food industries.

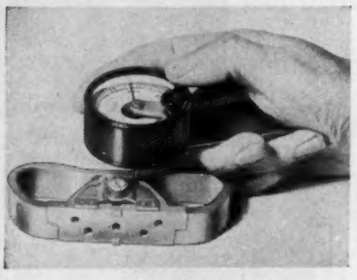
Method used is to spray cooling water over banks of coils in which the refrigerant is expanded. Water falls into a tank and is recirculated independently of distributing system, thereby gaining the closest control over temperatures and efficiency in heat transfer regardless of intermittent cooling operations or variations from maximum to minimum cooling load. It is possible to produce 33° water constantly without danger of damage from freezing as the system is open and does not depend for safety on the proper functioning of the back pressure regulating valve. To provide temperatures below freezing, coolers may be operated with the company's "No Frost" liquid solution.

Range of capacities in different sizes runs from 4.7 to 137 tons refrigeration. Model rated at 137 tons is 105-in. long by 88 in. high by 60 in. wide. Water deliveries range from 11 to 220 gpm.

Steel 2/25/46; *Item No.* 9007

Gauss Meter

Simplifying the measurement of flux of permanent magnets and direct current electromagnets, a new gauss meter, announced by General Electric's Meter and Instrument Division, Lynn, Mass., is a handy tool for checking flux gradients in air gaps and for determining direction, as well as density, of flux in leakage paths and air gaps. Utilizing a moving-magnet rotor at the end of an exploring prod,



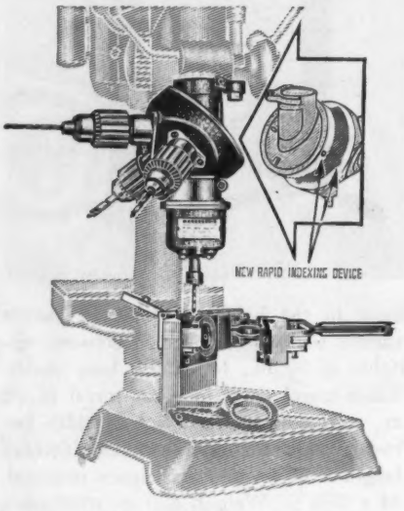
this miniature instrument permits flux to be measured at what amounts to a single point in either the air gap or the iron structure. Latter measurement is accomplished by drilling a 0.090-in. hole in the iron and inserting the prod in this hole to check "H" in the iron.

Extremely small area of sensitivity at the end of the exploring prod allows the meter to be used in obtaining detailed analysis of flux distribution. It is contained in a 2-in. round Textolite case with a hollow bronze exploring prod extending from the back. For instrument work, prods 0.075-in. in diameter and 1¼ in. long are furnished; for use with larger apparatus, prods 5 in. long by 0.090 in. in diameter are used. Indication of flux density in gauss is given on a 260° concentric scale; full-scale ranges of 100, 500, 1000, 2500, and 5000 gauss are available.

Steel 2/25/46; *Item* 9022

Indexing Device

Chicago Drillet Corp., 920 South Michigan avenue, Chicago 5, has recently announced an improvement in the method of indexing with the Quadrill. This in-



dexing device provides a fool-proof arrangement that will permit an inexperienced operator to speed up indexing and avoid error. It has a unique, positive, quick-locking action.

Steel 2/25/46; *Item No.* 9013

FOR MORE INFORMATION on the new products and equipment mentioned in this section, fill in this form and return to us. It will receive prompt attention.

Circle numbers below corresponding to those of items in which you are interested:

9028	9014	9003
9002	9026	9007
9052	9003	9022
9035	9008	9013
9080	9025	

2-25-46

NAME ..... TITLE .....

COMPANY .....

PRODUCTS MADE .....

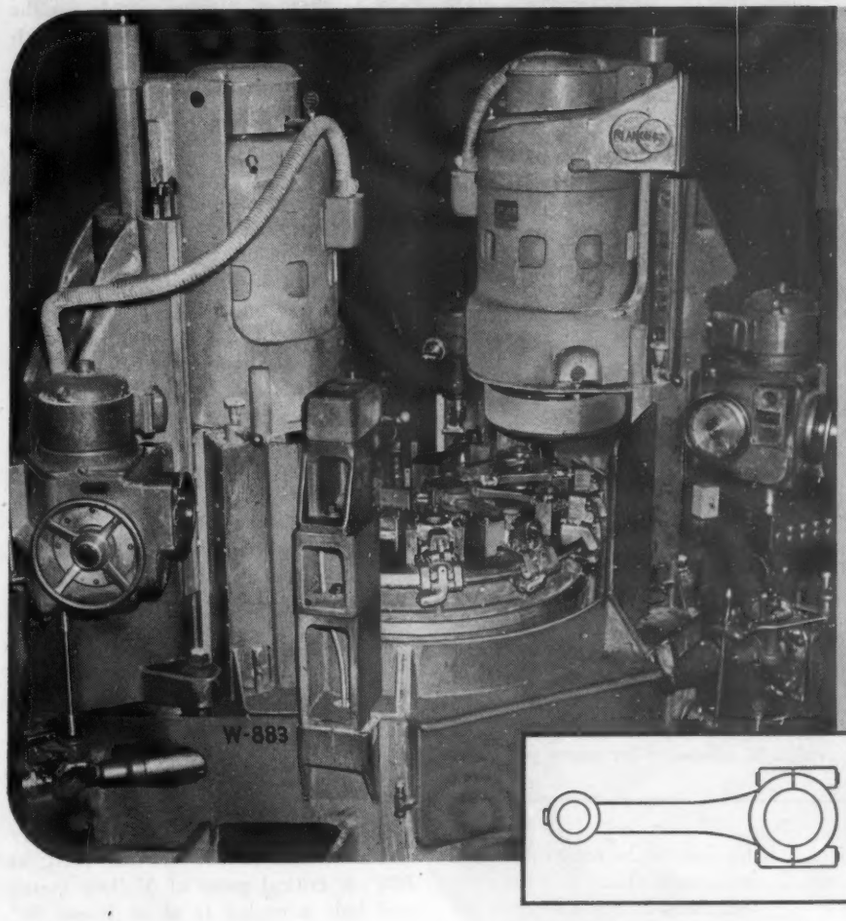
STREET .....

CITY and ZONE ..... STATE .....

Mail to: STEEL, Engineering Dept.—1213 West Third St., Cleveland 13, Ohio

(All claims are those of respective manufacturers; for additional information fill in and return the coupon on this page.)

"Put it on the Blanchard"



GET THESE *Advantages*

- Production ✓
- Adaptability ✓
- Fixture Saving
- Operation Saving ✓
- Material Saving
- Close Limits ✓
- Fine Finish
- Flatness ✓

Send for your free copy of "Work Done on the Blanchard", third edition. This new book shows over 100 actual jobs where the Blanchard Principle is earning profits for Blanchard owners.

These steel forged connecting rods are ground both sides of both ends on a No. 16-A Dual Blanchard Automatic Surface Grinder with a 43" chuck. The special 12-station fixture was designed and built by Blanchard.

From each side of both ends .012" of stock is removed to limits of ± .0005".

The production is at the rate of 400 surfaces per hour, or 100 completed pieces.

The 16-A Dual Blanchard is equipped with two grinding wheels, each with automatic size control, thus insuring the finished dimension.

Put it on the Blanchard for more economical production.

BLANCHARD

The **BLANCHARD** MACHINE COMPANY

64 STATE STREET, CAMBRIDGE 39, MASS., U.S.A.

Compressed Air

(*Concluded from Page* 91)

principle, the milling fixtures do not.

Another air pressure fixture is employed on a projection welding machine, (Fig. 6), which welds parts for power brake mechanisms. The worker steps on a foot switch to operate a solenoid valve which builds up pressure in a pressure switch. It, in turn, starts a timer for the welding operation and upon completion of welding, the timer reverses operation of the solenoid valve to release the air cylinder from the work.

Ingenious applications for compressed air on one punch press, a welding fixture or other single pieces of equipment are responsible for noticeable improvements in production. When applied to scores of machines in each department, such as is done at Midland Steel Products Co., the accomplishments make compressed air one of the major factors in successfully planning and meeting production schedules, either where the prime consideration is quantity output or low price for competitive markets.

Air tools such as an air-operated reamer also are adding to production effiiciencies at the automotive parts plant. In this operation there is a possibility of the tool stalling, but with air power there is no danger of burning the drill. Work continues without delay or expense for tool repairs. Another common use for air tools is to remove welding flux with a grinder.

Compressed air for these and other plant operations, such as cleaning machines and motors or for mixing the natural gas for more perfect combustion in heating furnaces for forging, is supplied by two motor driven, two-stage compressors of approximately 2400 and 2800 cfm capacity and two smaller compressors of 932 cfm capacity each, a total capacity of over 7000 cu ft.

Data and photographs supplied by Compressed Air and Gas Institute, 1111 Terminal Tower, Cleveland 13.

Safety Councilman Aids Accident Control Program

Each department of the Miami Shipbuilding Corp., Miami, Fla., and its ten units located in Greater Miami, has one "Safety Councilman" for the day shift and another for the night shift. This employee represents his department in all matters of safety.

These selected employees serve in their regular capacities as mechanics, welders, wood workers, etc., and are selected to be councilmen because of their skill, cooperative spirit, and alertness. In most cases selection is made on recommendation of the department foreman who forwards to the Safety Council the employee's name, the type of work he is doing, and reasons why he has been nominated.

Safety Councilman is the link between actual on-the-job work and safety director. He makes safety suggestions to his fellow employees (numbering from 1030 to 1950) and sees that they follow rules in safety code book. It is his duty to report immediately any findings regarding an accident hazard or an employee who is not co-operating.

If a councilman should go to another department or to other sections of the plant it is his duty to be constantly alert for accident hazards. Often it is the case that the councilman in some department has failed to catch some hazard in his own division. A visiting councilman with a fresh perspective may locate a hazard which has been overlooked.

From time to time all safety councilmen are taken on a tour of the entire plant. Usually the safety committee, a group made up of officials and department heads, and the safety director also go on tour.

At safety meetings actual accidents are discussed, and councilmen asked for recommendations as to how the accident could have been avoided and what steps should be taken to see that such an accident is not repeated. Councilman can be either a man or a woman.

During th past 2 years, plant has had no fatal accidents. Combined frequency rating for the past year shows an average of 31.28 cases of lost time accidents, including major and minor accidents. There has been no loss of time on minor accidents, and in a 2 year period there have been five amputations of fingers. A doctor and a staff of registered industrial nurses are always present, and every attention is given to safety equipment. Machines are well guarded, and guides and guards are used on all machines where possible. When there is a safety factor to be considered in buying new or replacement equipment, safety is given priority. All belts and other moving parts are under protection guards. Where it is impossible for the necessary operation to be performed with an installed guard, other safety devices are worked out—such as punch sticks, tongs, planking boards, etc.

Before going to work, all new employees are taken from point to point within the organization by a representative of the personnel department and some one from the safety council. One of the first things a new empoyee receives is the handbook on safety. When the employee reaches the department of assignment and is turned over to the foreman or superintendent, the particular safety rules and regulations for the department are explained. The man in charge points out the department's natural hazards and it is his duty to see that the new employee is provided at once with equipment of protection. New employees also are introduced to the department Safety Councilman before being assigned to work.

Steel Plant Directory

Copies of "Steel Expansion For War" by W. A. Hauck of the Reconstruction Finance Corp., plus an 18-page supplement bringing the report up to date, now may be obtained for $2 by addressing Book Department, STEEL, 1213 West Third Street, Cleveland, O. The 192-page book and the 18-page supplement comprise a complete report on the expansion of the steel industry and related industries during the war and will serve as a valuable reference for many years.

Metallizing

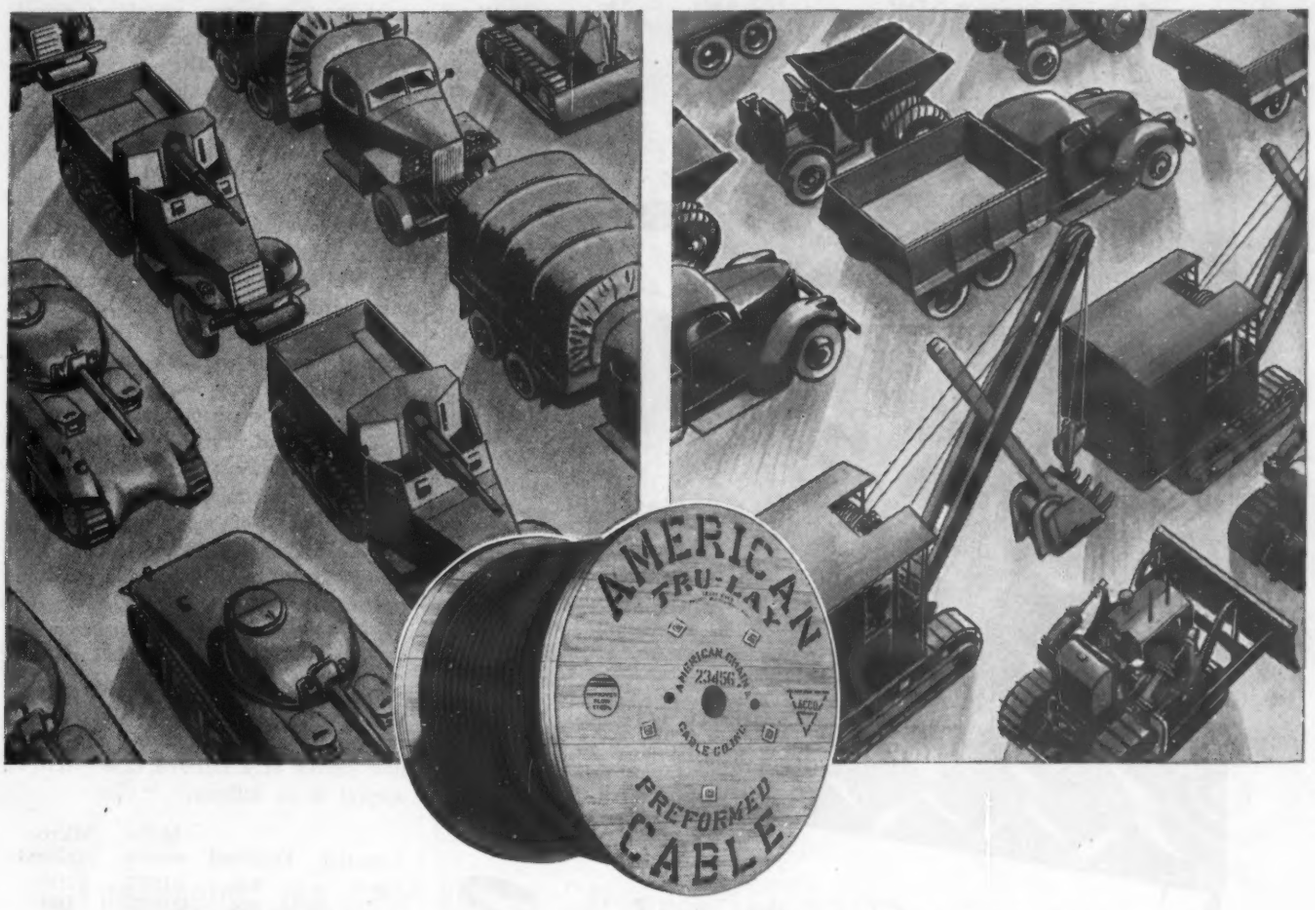
(*Concluded from Page* 114)

tire which is sweated on the rim. This rim is built up to required dimensions by metallizing with copper. The Mallory tire is heated to 500° F (the limit, as 520° is critical point of Mallory metal) and hub is cooled to about minus 60° F. Expansion/contraction difference adds up to about 0.045-in. Then tire is carefully slipped over the hub, almost instantly becoming immovable and permanently frozen to it. Alternate method of fastening tire to the hub by soldering with 95-5 solder (95 per cent tin, 5 per cent lead, zinc, antimony) is not as tight, and the solder is not as perfect a conductor as copper.

Microcasting Vitallium

Precision casting process developed by Austenal Laboratories Inc., 5932 South Wentworth avenue, Chicago, is described in a booklet which explains industrial design advantages obtained with company's Microcast method. History and early applications of this method also are briefly traced. In addition, specifications and physical and chemical properties of vitallium microcastings are given as an example of one type high melting-point alloy used in this process. Illustrations show many castings of intricate shape and design which have been produced of high melting-point, non-machinable alloys. There also is a pictorial step by step description of the process.

a Plan for *NOW!*



3,000,000 jobs are now ready, thanks to the American Road Builders' Association. That organization sponsored a bill (now authorized by Congress) to provide one and one-half billion dollars of Federal money for road repair and new highway construction. To receive its share of these funds, each state must match its Federal request with a like amount of its own.

Here is a sound plan for putting returning veterans, and dislocated war workers to work on needed highway, bridge and airport construction. It will make work for millions more in durable and consumer goods industries. It will benefit all America by providing necessary facilities and helping stabilize our post-war economy. For full information regarding this vital plan get free copies of the illustrated booklets titled: "The Road Ahead" and "Put Your Town on the Air Map." Get them by dropping a card to the American Road Builders' Association, 1319 F Street, N.W., Washington, D. C.

ARMY E NAVY

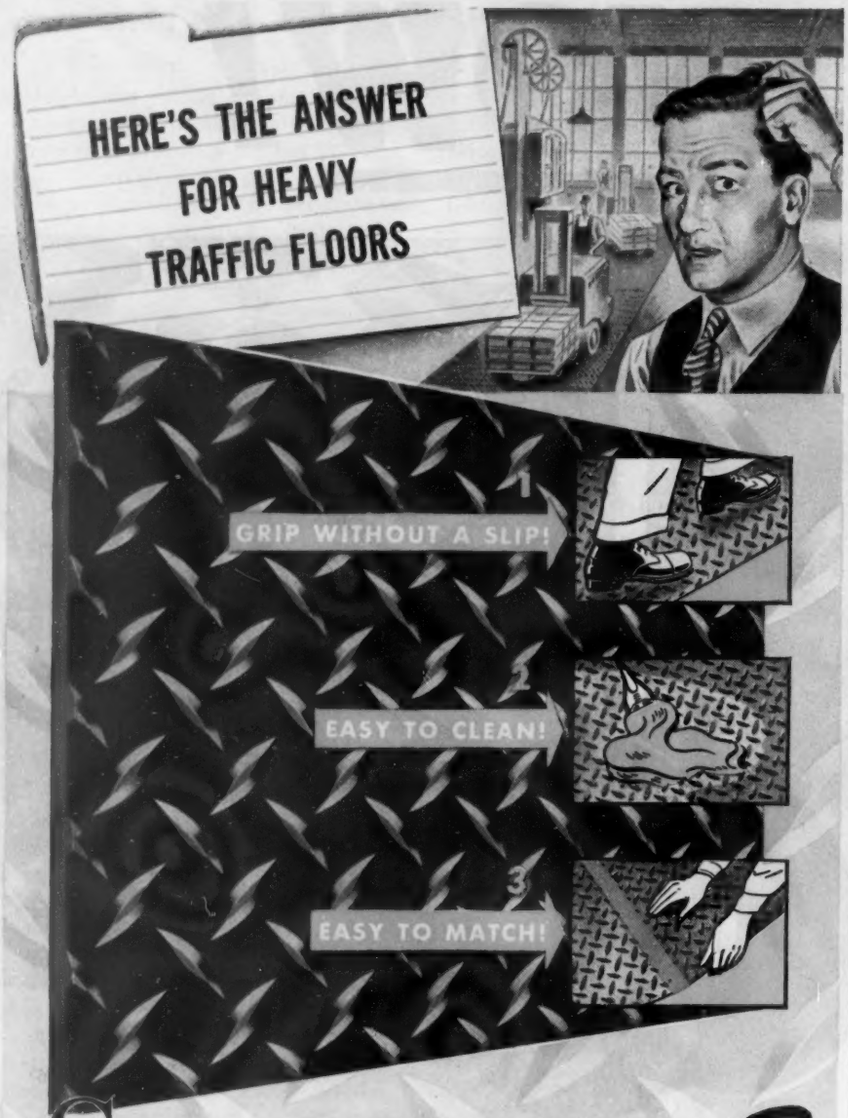
ACCO

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Emlenton, Pa., Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Seattle, Bridgeport, Conn.

TRADE MARK

AMERICAN CABLE DIVISION
AMERICAN CHAIN & CABLE

In Business for Your Safety



So you can Count on these 3

To the inherent characteristics of steel floor plate (such as durability, ability to stand tough traffic, oil, heat, fire and crackproof and no maintenance cost) add, for A. W. Super-Diamond these three distinctive advantages well worth knowing about for safer floors. Notice the shape of the elevations and the pattern? 30% minimum contact area with the shoe. Sloping sides that maintain "sharpness" of contact, resist dirt collection, make for easier cleaning, better draining. And a pattern that matches more easily with less scrap! These are reasons why alert architects, builders, product engineers, and purchasing agents are insisting on AW Super-Diamond Floor Plates.

Write For 16 page Booklet L-29 Giving Helpful Information on Weight Per Square Foot and Maximum Sizes. Alan Wood Steel Company, Conshohocken, Pa.

AW SUPER-DIAMOND
FLOOR PLATES THAT GRIP
A Product of ALAN WOOD STEEL COMPANY

Microhardness Tester

(*Concluded from Page* 100)

most grades are not workable and must be cast to shape and ground.

Metallurgically, the cobalt-chromium-tungsten alloys consist of complex chromium and tungsten carbides in a solid solution matrix containing principally cobalt. Fig. 12 shows Stellite No. 1, an as-cast structure. The microhardness of the extremely hard carbides is 1610-1610, and of the eutectic background, 905-905.

Fig. 13 is Stellite No. 1 after a solution treatment and slow cool and showing a uniform eutectic mixture. A check made on this structure with the much lighter 0.200 kg spring gave microhardness readings of 760. This exact check, made with two widely different loads on the indentor, indicates the absence of any work hardening capacity. This is what would be expected in this hard brittle alloy.

Fig. 10 shows Stellite No. 93 after a solution treatment at 1950° F. The microhardness of extremely hard primary carbides is 1240, of eutectic mixture 735, and of dark secondary carbide phase 863.

Fig. 11 is a microhardness traverse on a specimen of stainless steel Type 410, which built up a nitrided case by exposure in an ammonium converter for one and one-half years. A hardness survey of a nitrided case (0.116-kg spring) is as follows:

Location	Diagonal	Millimeters	Microhardness
Stock	6.8	0.0357	168
"	6.8	0.0357	168
"	5.1	0.0268	299
Case	2.8	0.0147	993
"	3.2	0.0168	761
"	3.3	0.0174	715
"	3.2	0.0168	761
"	3.3	0.0174	715
"	3.2	0.0168	761
"	3.0	0.0158	866

Fig. 15 shows hardness impressions made on a phenol-resin plastic (Heresite) sprayed on carbon steel as a corrosion resistant coating. The coating is sprayed on the material to a thickness of 0.002-in. and then baked to polymerize the phenol-resin.

Fig. 16 shows pyramidal hardness impressions in an enamel coating.

(1) S. L. Hoyt, "Hardness and Hardness Measurement" by S. R. Williams, pp. 149.
(2) George L. Kehl, "The Principle of Metallographic Laboratory Practice", pp. 196-200.
(3) Heinrick Hanemann and Askar Bernhardt, *Metals and Alloys*, vol. 12, No. 1, 1940, pp. 108.
(4) S. L. Hoyt, *Transactions*, American Society for Steel Treaters, vol. 6, 1924, pp. 296-420.
(5) R. Steinetz, "Micro Hardness Tester, a New Tool in Powdered Metallurgy", in *Metals and Alloys*, vol. 17, 1943, pp. 1183.
(6) W. A. Wissler, "Alloys of Cobalt, Chromium and Tungsten" in *Metals and Alloys*, vol. 36, No. 2, 1939.

Announcing the new Robins Car Shakeout

Here's another Job-Engineered 1st—by Robins—that is literally taking the country by storm. This startlingly new car shakeout actually accomplishes what its name implies. Operating at high speed, it literally *shakes* a load of coal, coke, or ore through the hopper doors at the bottom of the railroad car. A tightly packed 70- or 100-ton car is unloaded in a matter of minutes—broom clean. Work that previously required six men can be done by two. Railroads endorse this new Robins product which injures neither cars nor unloading facilities in any way. And it's so versatile and portable that it can be used virtually anywhere a coal or ore car is to be unloaded. No elaborate installation or housing construction is necessary. A note on your letterhead, or a phone call, will bring complete literature or a Robins Job-Engineer to your desk to prove how this new car shakeout, exclusive with Robins, can virtually eliminate bulk materials unloading problems.

AMERICA'S ONLY *COMPLETE* MATERIALS HANDLING SERVICE

Hewitt and Robins unite to offer you 136 years of combined experience in Job-Engineered rubber products and machinery designed to answer any materials handling problem you may have.

ROBINS
CONVEYORS INCORPORATED
PASSAIC, NEW JERSEY
DIVISION OF HEWITT RUBBER CORPORATION

the BUSINESS TREND

INDUSTRIAL ACTIVITY is regaining momentum now that steelworkers are back at work after a month-long strike. Because of the immensity of the job of putting the steel mills back into operation it will take several weeks for the rate of industrial activity to return to its pre-strike level. Likewise, the buoyant effect on the rate of industrial activity of resumed or accelerated operations in steel-consuming plants will lag until supply lines are refilled. However, the height which the nation's industrial activity rate attains will be determined to some extent by how satisfactorily prices become adjusted in relation to costs. In the week ended Feb. 16, final week of the steel strike, STEEL's industrial activity index registered 75 per cent (preliminary), unchanged from the previous week's low mark of the steel strike period.

COAL—One bright spot during the steel strike was bituminous coal production. Cumulative output this year through Feb. 9 was 0.8 per cent ahead of that of the corresponding period last year. This was some help in replenishing low stocks, for while coal production was high consumption was reduced in the steel industry, and plentiful stocks will be an asset in event negotiation for a new miners' contract is accompanied by a miners' strike.

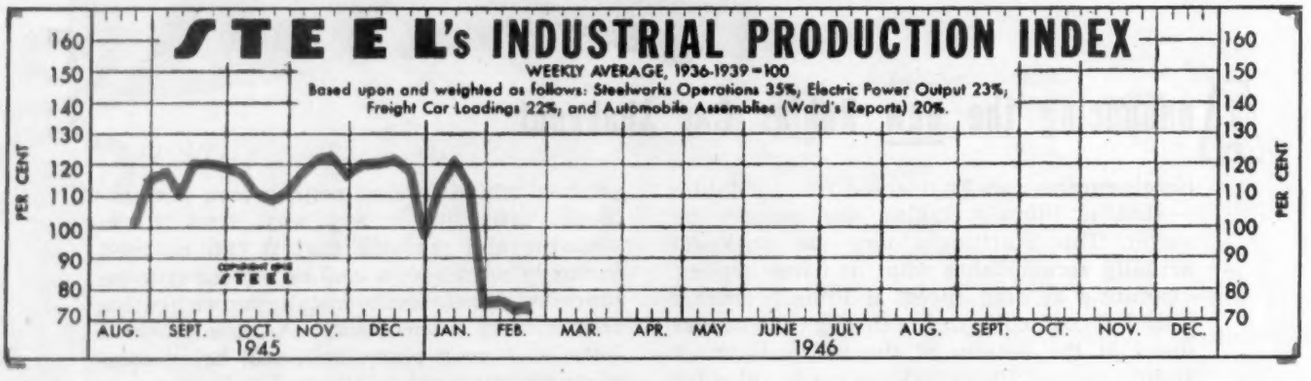
AUTOS—An effect of the steel strike was a reduction in the number of automobiles assembled in the week ended Feb. 16 to 21,555 units, compared with 23,785 in the previous week. Chrysler Corp. accounted for 9440 cars in the week ended Feb. 16, and Ford Motor Co. produced 2010.

PRICES—Higher prices for agricultural and industrial commodities during the week ended Feb. 9 raised the average primary market price index prepared by the Bureau of Labor Statistics to a new postwar peak, 107.1 per cent of the 1926 average.

BUSINESS FAILURES—A 22 per cent rise in commercial and industrial failures occurred in the first five weeks of 1946, compared with the corresponding period of 1945. Reduction of government purchases for war and defense and a narrowing difference between rising costs and ceiling prices probably are responsible for elimination of some marginal firms.

UNEMPLOYMENT—Highest point in claims for unemployment compensation since V-J Day was recorded in the week ended Jan. 26 with 2,150,500 initial and continued claims. That figure likely will be exceeded when reports are available for the steel strike period when many plants which were not struck had to curtail operations because of lack of materials.

FORGINGS—Shipments of steel forgings in December totaled 103,986 tons, 12 per cent under November, and unfilled orders at the end of December amounted to 603,390 tons, 3 per cent under those at the end of November.



The Index (see chart above): Latest Week (preliminary) 75 Previous Week 75 Month Ago 117

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)	5.5	5.5	70	93
Electric Power Distributed (million kilowatt hours)	3,949	3,983	4,145	4,472
Bituminous Coal Production (daily av.—1000 tons)	2,073	2,083	1,917	2,047
Petroleum Production (daily av.—1000 bbls.)	4,710	4,690	4,606	4,781
Construction Volume (ENR—Unit $1,000,000)	$44.1	$55.5	$45.4	$43.9
Automobile and Truck Output (Ward's—number units)	21,555	23,785	28,465	20,010

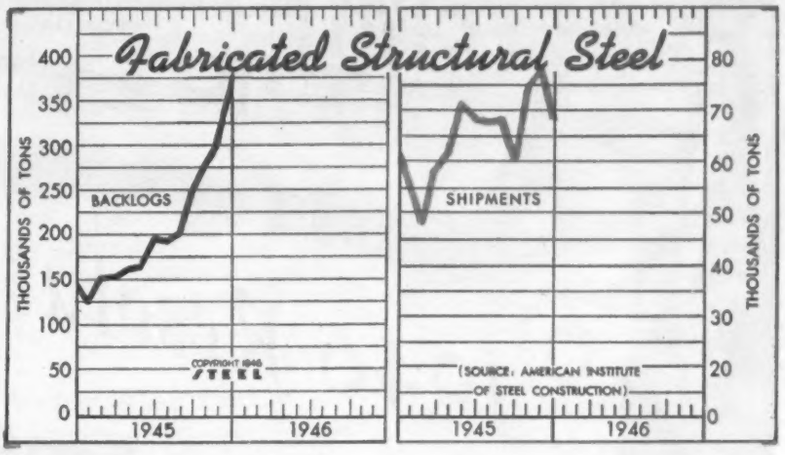
*Dates on request.

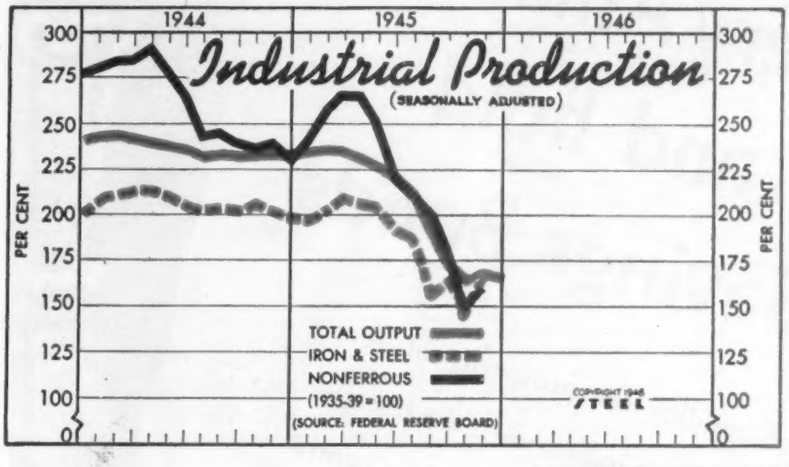
TRADE				
Freight Carloadings (unit—1000 cars)	715†	713	749	784
Business Failures (Dun & Bradstreet, number)	25	27	20	23
Money in Circulation (in millions of dollars)‡	$27,967	$27,929	$28,119	$25,533
Department Store Sales (change from like wk. a yr. ago)‡	+25%	+20%	+13%	+21%

†Preliminary. ‡Federal Reserve Board.

Fabricated Structural Steel
(1000 tons)

	Shipments			Backlogs		
	1945	1944	1943	1945	1944	1943
Jan.	57.0	35.2	91.9	124.4	113.1	339.1
Feb.	49.0	42.9	90.8	131.6	117.6	321.0
Mar.	59.3	41.4	91.0	133.3	106.3	299.8
Apr.	62.8	44.5	86.6	102.5	111.2	272.5
May	72.6	50.7	78.9	165.7	116.3	220.6
June	69.2	43.0	68.4	193.2	122.7	207.1
July	60.9	45.3	56.8	194.0	125.4	201.8
Aug.	70.6	55.2	50.2	201.1	130.4	195.6
Sept.	63.4	57.5	51.8	248.3	151.1	208.1
Oct.	76.6	61.6	80.1	282.8	174.4	274.0
Nov.	78.0	59.4	42.7	304.9	184.3	134.6
Dec.	68.8	61.3	39.6	373.2	142.5	113.0
Total	707.4	597.9	831.8	....	....	....



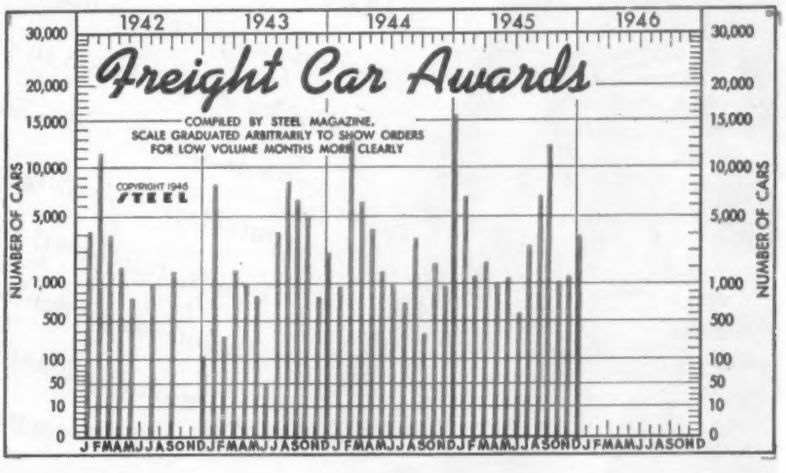


Federal Reserve Board's Production Indexes
(1935-39 = 100)

	Total Production		Iron, Steel		Nonferrous	
	1945	1944	1945	1944	1945	1944
Jan.	234	243	197	205	240	281
Feb.	236	244	202	212	237	285
Mar.	235	241	210	214	265	286
Apr.	231	239	206	213	264	293
May	226	236	204	210	251	279
June	220	233	192	204	219	264
July	211	230	187	202	210	243
Aug.	187	232	153	203	198	245
Sept.	171	230	163	202	176	239
Oct.	163	232	146	206	147	236
Nov.	168	232	167	201	159	239
Dec.	164	232	164	198	...	229
Avge.	204	235	183	206	...	260

Freight Car Awards

	1945	1944	1943	1942
Jan.	7,200	1,020	8,365	4,253
Feb.	1,750	13,240	350	11,725
March	2,500	6,510	1,935	4,080
April	1,120	4,519	1,000	2,125
May	1,526	1,932	870	822
June	670	1,150	50	0
July	3,500	795	4,190	1,025
Aug.	7,240	3,000	8,747	0
Sept.	12,840	400	6,820	1,863
Oct.	1,320	2,425	5,258	0
Nov.	1,650	1,065	870	0
Dec.	4,116	16,245	2,919	135
Total	45,432	53,221	41,374	26,028


1942
1943
1944
1945
1946
Freight Car Awards
COMPILED BY STEEL MAGAZINE.
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
COPYRIGHT 1946 STEEL
NUMBER OF CARS
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

FINANCE

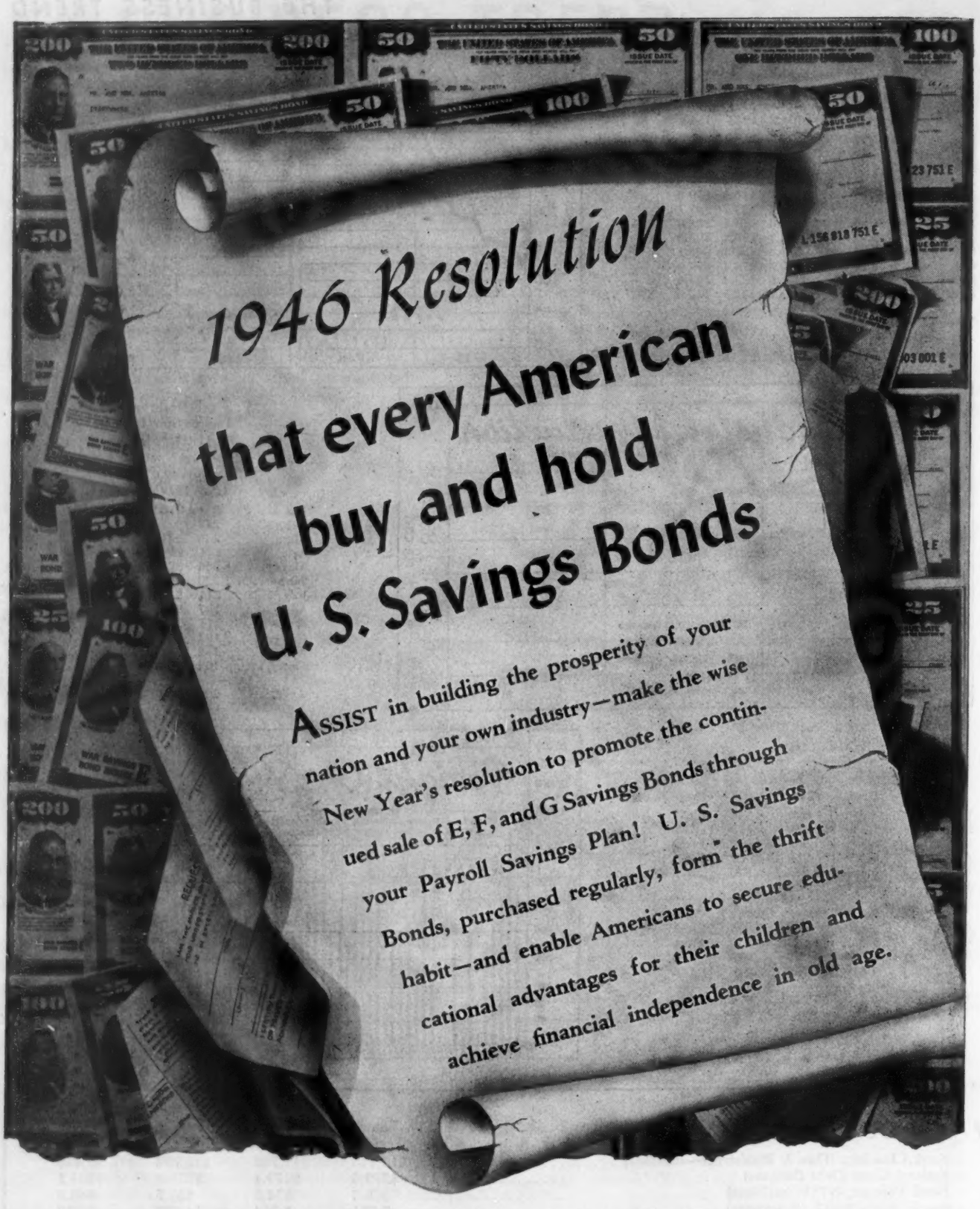
	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$10,413	$11,736	$12,758	$9,450
Federal Gross Debt (billions)	$279.5	$279.4	$278.0	$234.2
Bond Volume, NYSE (millions)	$30.3	$34.8	$51.7	$46.6
Stocks Sales, NYSE (thousands)	7,581	8,754	14,668	8,320
Loans and Investments (billions)†	$68.2	$68.2	$67.8	$59.0
United States Gov't. Obligations Held (millions)†	$49,716	$49,656	$49,133	$44,219

†Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$58.27	$58.27	$58.27	$57.55
All Commodities†	107.1	106.8	106.7	104.9
Industrial Raw Materials†	119.3	118.9	119.0	116.0
Manufactured Products†	103.2	102.9	102.8	101.6

†Bureau of Labor Statistics Index, 1926 = 100.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STEEL

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HELPFUL LITERATURE

1. Aluminum Alloy

Reynolds Metals Co., Aluminum Div. — 8-page illustrated bulletin No. 54-A lists properties and presents application data on R303 Reynolds aluminum alloy which features high strength and excellent corrosion resistance. Developed primarily for extrusions and forging stock, it is available also in sheet form. Bars, rods, extruded shapes and bare and clad sheets can be supplied.

2. Variable Speed Drive

Reeves Pulley Co.—28-page illustrated catalog No. M-441 shows design and operating features of the Reeves Vari-Speed Motodrive which combines motor, variable speed mechanism and gear reducer in single unit. It is designed for use on production machines where space is limited or where direct connection to machine is necessary or desirable.

3. Hydraulic Components

Pesco Products Co. — 4-page illustrated bulletin No. 11 is entitled "Pesco Hydraulics for Tractors and Industrial Application." Tractor pumps, general-purpose pumps, multiway valves and hydraulic motors are described briefly. Condensed information is given on other of company's products which are applicable for hydraulic systems.

4. Detergent Powder

Pennsylvania Salt Mfg. Co. — 4-page illustrated leaflet on Pensal outlines uses of this safe-to-use detergent powder. This compound is used as alkali break with soap. It can be added to standard soap solution, and is combined soap builder and detergent.

5. Heating Equipment

Trane Co. — 84-page illustrated bulletin No. PB-290 describes heating, cooling, ventilating, air conditioning, air handling, heat exchanging and other postwar products announced by company. Equipment is adaptable for domestic, industrial, commercial, process, maritime and other applications.

6. Coal & Coke Buckets

Hayward Co.—4-page illustrated bulletin No. 675 describes improved class E-15 grab bucket for handling solid fuels. It describes and illustrates modern methods of handling coal efficiently. Chart of bucket load capacities, weights and dimensions is included.

7. Electric Furnaces

K. H. Huppert Co.—36-page illustrated loose-leaf type catalog presents information, specifications and prices of electric furnaces with chambers measuring from 1-3/8 x 1-1/4 x 2 inches to 16 x 13-1/4 x 44 inches, in both bench and floor models. Temperature indicating and control instruments are also discussed.

8. Convection Furnaces

Hevi Duty Electric Co.—12-page illustrated bulletin No. HD-1245 gives specifications, applications and construction data on pit type convection furnaces and special pit type furnaces. Typical installations of these electrically heated furnaces are shown.

9. Friction Material

General Metals Powder Co.—4-page illustrated bulletin gives application and selection data on Gempco powdered metallic friction materials. Typical materials developed for use in brake and clutch designs are shown. Friction disks can be made in diameters as small as 3/4-inch in thicknesses ranging from 3/8-inch or more down to 0.015-inch or less.

10. Precision Castings

Kaukauna Machine Corp.—32-page illustrated plastic-bound brochure on precision castings for industrial machinery. Production of precision gray iron castings for machine tools, engines and other industrial applications is described and typical examples are shown. Kaukauna iron specifications are given, and mechanical and physical properties are listed in tabular form.

11. Buckets

Orton Crane & Shovel Co.—16-page illustrated bulletin No. 75 describes Orton 5-type range of buckets. Ratings, dimensions and other data are presented on Powerwheel, rehandling, excavating, double-action and orange-peel buckets, and wood grapples.

12. Dry Cyaniding

Surface Combustion—4-page illustrated bulletin "Dry Cyaniding in Surface Combustion Furnaces" explains advantages of this process and features of furnaces which adapts them for this purpose. Analyses of dry cyaniding atmospheres are given.

13. Nondestructive Testing

Sperry Products, Inc. — 4-page illustrated bulletin No. 3000 discusses use of Sperry Supersonic Reflectoscope which is used for nondestructive testing and measuring of materials. Internal defects can be determined quickly through use of this electronic equipment which uses supersonic vibrations and timing to effect test.

14. Face Mills

Beaver Tool & Engineering Corp. — 4-page illustrated folder describes solid carbide blade face mills, gives cutter and blade specifications, and presents recommendations for use. Sharpening procedure is covered.

15. Wear in Machines

Nitralloy Corp.—46-page illustrated data book entitled "Wear—A Discussion of the Mechanism of Wear Phenomena and Influencing Factors," by D. Landau, industrial applications engineer, discusses all types of wear in machines and presents findings aimed toward wear reduction under various circumstances. Typical cases of wear are shown. Bibliography is included.

16. Welding Electrodes

Page Steel & Wire Div., American Chain & Cable Co. — 17 x 26-inch wall chart tabulates grade, use, colors, recommended current and polarity, as-welded physical properties and analysis of weld metal deposit for line of stainless steel welding electrodes. Similar data are given on carbon steel shield arc electrodes, bare and Sul-Coated electrodes and gas welding rods.

17. Overlay Electrodes

Sight Feed Generator Co.—4-page illustrated bulletin on Rexalloy overlay electrodes describes properties and characteristics of line of alternating current or direct current straight or reversed polarity electrodes for use on all ferrous metals and alloys. Application procedure is outlined briefly.

18. Hydraulic Baling Press

Harris Foundry & Machine Co.—4-page illustrated folder presents details of model K hydraulic baling press for baling sheet metal clippings from press shops. Simplicity of operation and low operating costs are features of machine.

19. Precision Gages

George Scherr Co.—4-page illustrated regular publication "Precise Production" No. 111 describes new gage block utility set, magnetic base ball-joint back dial indicator, vernier caliper, tachometers, magnetic V-blocks and other equipment.

20. Straightening Press

Bee-Line Co.—4-page illustrated folder presents data on 125-ton straightening press with complete tool equipment for precision straightening of solid bars, piping, housings and flat sheets. Gage and tool equipment is also listed.

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21. Machinery

Williams-White—84-page illustrated catalog contains complete information on line of machinery which includes hydraulic presses, moving-up presses, straightening presses, hydraulic bulldozers, pipe and miscellaneous benders, bulldozers, tube benders, reinforcing bar benders, rod benders, angle rolls, taper forging rolls, plate rolls, punches, billet breakers, shears, tie rod presses, multiple punches, trimming presses, hammers and riveting machines.

22. Precision Castings

Austenal Laboratories, Inc.—8-page illustrated bulletin No. 100 describes Microcast process of producing small precision castings of Vitallium, high fusing, nonmachinable, nonforgeable, corrosion, wear and abrasion resistant alloy. History, technique and applications are covered. Advantages are set forth.

23. Abrasive Points

Robertson Mfg. Co. — 28-page illustrated booklet on Cyclone mounted wheels and points presents information on critical speeds, operating rules, standard shapes and sizes. Also offered is engineering service for recommendation of proper wheel or point for specific application.

24. Press Brake Dies

Cyril Bath Co. — 36-page illustrated catalog No. D-22 presents data on dies for press brake use. Included are multiple punching equipment, forming, blanking, straightening and louvring dies. Suggestions for care and use of dies as well as tables of pressures helpful in press brake work are included.

25. Gear Alloy

Ampco Metal, Inc.—4-page illustrated bulletin No. 35 is entitled "Ampco Metal in Gears". Use of this aluminum bronze in gear applications is discussed with data presented on grades and characteristics of metal recommended for various applications. Advantages claimed for material are high tensile strength, yield strength and elongation characteristics.

26. Rust Preventive

Rusticide Products Co.—4-page illustrated folder "Stop Rust with Rust-I-Cide" explains action of this noninflammable, nontoxic compound which prevents rust, primes metal for painting, cleans nonferrous metals, removes rust and removes stains from porcelain.

27. Mine Conveyors

Robins Conveyors Inc. — 16-page illustrated bulletin No. 127 is descriptive of line of conveyors which are engineered for mine application. Construction features, typical installations, available sizes and other data are presented.

28. Double Angle Shears

Thomas Machine & Mfg. Co.—4-page illustrated bulletin No. 310 describes and gives specifications of angle shears for making square cuts or miter to any desired angle up to 45 degrees, either right or left hand. Four sizes of machines are covered.

29. Bright Nickel Plate

Udylite Corp.—8-page illustrated bulletin No. 51 describes bright nickel plating process for protective and ornamental product coating. Listed are plating applications, bath formulas, operating conditions, recommended voltages and amperages for best results.

30. Adjusting Machine

Watson-Stillman Co.—8-page illustrated bulletin No. 540-A describes Walter Stock adjusting machine for lengthening, straightening or shortening parts of running and valve-motion gear of locomotives. Specifications and data on operations that can be accomplished on machine are set forth.

31. Door & Gate Operators

Barber-Colman Co.—4-page folder form No. 2178 entitled "Save Time, Heat, Health and Tear" describes Barcol electric operators for sliding and swinging doors and gates. Design, installation and advantages of use are discussed. Radio controlled units are also presented.

32. Dust Collectors

Claude B. Schneible Co.—20-page illustrated bulletin No. 310 describes Multi-Wash equipment for control of dust, fumes and odors. Dust collectors, settling and dewatering equipment, sludge pumps, entrainment separators, and portable self-contained dust and fume collection system are described.

33. Hole Punching Units

Wales-Strippit Corp. — 40-page illustrated catalog describes type BL hole punching units. They are self-contained, independent units that have punches, dies, stripping guides, stripping springs and guide buttons designed into holder which automatically aligns punches and dies.

34. Mercury Arc Converters

Allis-Chalmers Mfg. Co.—8-page illustrated bulletin No. B6373 presents data and information on line of mercury arc converters for induction heating operations in 500 to 2000-cycle frequency range. Complete equipment for induction heating is covered. Specifications, graphs and cutaway illustrations of Excitron converter and its operation are given.

35. Steel Melting Furnaces

Ajax Electrothermic Corp.—16-page illustrated bulletin No. 11-B describes high speed precision melting of alloy steels and other ferrous metals in Ajax-Northrop induction furnaces. Units with capacity from 120 pounds to several tons are shown and information is given on shop planning and proper equipment to give production schedule.

36. Welding Accessories

Air Reduction Sales Co.—16-page illustrated price list and catalog No. 40 covers Airco gas welding and cutting supplies and accessories. Information concerning properties and uses accompanies each article listed. Precise quantitative data are included. Stock numbers of accessories and supplies, and list of offices are included.

37. Circuit Breakers

Westinghouse Electric Corp.—40-page illustrated booklet No. DD-29-060 describes Nofuze De-ion circuit breakers for lighting, distribution and power circuits up to 600 amperes. Principles of arc quenching are explained, and design and operation of breakers are covered. Special attachments are presented, and recommendations for selection and application are included.

38. Flow Control Valves

Vickers Inc.—4-page illustrated folder entitled "Vickers Flow Control Valves for Feed, Speed or Volume Control in Oil Hydraulic Circuits" includes specifications, features and installation data. Typical circuits are shown. Price list is included.

39. Nonferrous Castings

Universal Castings Corp.—16-page illustrated brochure covers design, patternmaking, production control and use of precision nonferrous castings made by Capaco process to specifications. Brass, aluminum bronze, manganese bronze, silicon bronze, nickel aluminum bronze, beryllium copper and aluminum castings are discussed. Process is outlined and advantages are covered.

40. Water Purification

Worthington Pump & Machinery Corp.—6-page illustrated bulletin No. W-212-B4 entitled "Worthington Ion-Exchange Process for the Purification of Water" describes process and shows typical installation. Advantages of system are outlined.

41. Wire Rope

Union Wire Rope Corp.—4-page illustrated educational bulletin Vol. 3, No. 1 discusses replacement of wire rope and includes information on size, tread, diameter and type of construction. Bulletin is designed to help in proper selection of replacement rope.

42. Fabricated Metal Products

Stanwood Corp. — 12-page illustrated bulletin No. 15 gives details of line of fabricated products which includes baskets, trays, fixtures, carburizing boxes and retorts. Typical products made for specific applications are shown.

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MARKET SUMMARY

Steel Buyers Awaiting OPA Price Schedules

Many consumers' plants closed for lack of steel . . . Price uncertainty keeps some idle . . . Ingot rate rises from 5½ to 16 per cent

WHILE there has been increase in steel demand since end of the strike a week ago it is restricted. Many consuming plants still are closed because of lack of steel supply. Also consumers before placing new tonnage, want to know not only the cost of steel products they require under the price schedule now being formulated, but also the markup on other materials and their own labor costs.

A further deterrent is the fact that steel producers are discouraging placing of further orders until they have a clearer conception of how they can schedule it. Mills have been getting back into production slowly and some producers up to the end of last week had not signed new labor contracts.

A number of consuming plants still idle are closed because of unsettled labor disputes, and these include some of the largest, such as are found in the electrical, automotive and railroad equipment industries. Despite resumption of steel operations the new government wage-price policy has not yet resulted in appreciable decline in strikes in most branches of the metalworking industry.

At the same time many plants are down either because of lack of steel, having exhausted inventories, or must close temporarily before mills can come to their rescue with further supply. Prediction is made by trade leaders of a further drop before improvement starts. Some large consumers assert it will be another two or three weeks before they will have sufficient steel to warrant resumption of operations. They and others are pressing for steel tonnage already on books.

Most producers expect an appreciable increase in output this week, although it may require another two or three weeks before fairly normal operation is reached, some mills requiring longer that that. Steel production thus far has been retarded by lack of iron and other raw materials, even where conditions otherwise have been favorable. Some producers who signed labor contracts promptly have turned out only a relatively negligible quantity of steel, pending resumption of blast furnace operations or iron shipments from outside.

Various leading sellers, in attempting to set up schedules, estimate a loss of six weeks to two months because of the strike and difficulties in getting back to normal, even more in the case of some products. Because of many requests for certain types and sizes of steel in which special shortages have developed during the strike, representing changes in original orders, mills are freezing schedules for several weeks, to obtain maximum output.

Shipments now going forward are being billed on the basis of prices ruling prior to Feb. 15, with the provision that any increase in the price schedule now being set up will be added, in accordance with the new OPA ruling.

Steelworks operations last week are estimated at 16 per cent of capacity, a rise of 10½ points from the 5½ per cent of the prior week. This rate probably does not represent that much merchantable steel as first casts are likely to be off grade. Every district showed some gain, with the exception of two, St. Louis at 19 per cent and Detroit at 32. Pittsburgh gained 16 points to 17½ per cent, Chicago 15½ to 20 per cent, Cleveland 17 points to 17, eastern Pennsylvania 7 points to 13, Cincinnati 26 points to 70, Buffalo 23½ points from nothing, Wheeling 7 points to 63, New England 35 points to 45, Youngstown 20 from nothing and Birmingham 12 from nothing. The Los Angeles district reported operations at 68 per cent.

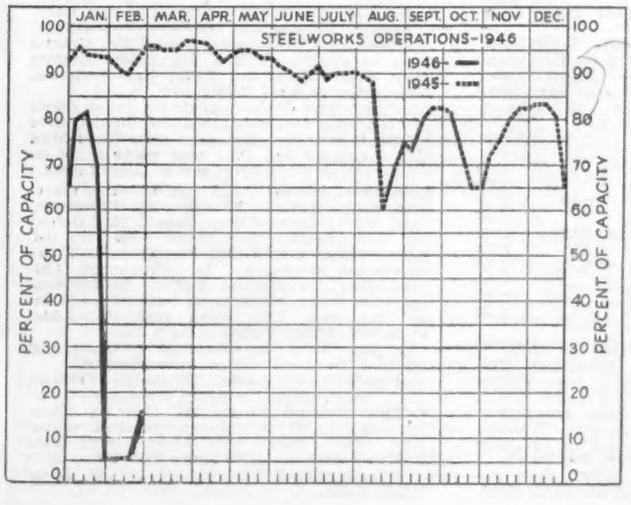
Scrap movement has been resumed actively as consumers start production after the strike, though conditions are somewhat confused by the large number of cars awaiting unloading at plants. Melters are anxious for more tonnage and all offerings are being absorbed. Dealers find difficulty obtaining sufficient material to fill orders. No buying is being done now but a new wave is expected early next month. Blast furnace and open-hearth grades are most in demand, with low phos not needed so badly and cast grades almost unobtainable.

DISTRICT STEEL RATES

(Percentage of Ingot Capacity Engaged in Leading Districts)

	Week Ended Feb. 23	Change	Same Week 1945	Same Week 1944
Pittsburgh	17.5	+16.5	88	92
Chicago	20	+15.5	99.5	102
Eastern Pa.	13	+ 7	91	94
Youngstown	20	+20	92	95
Wheeling	63	+ 7	97.5	93
Cleveland	17	+17	90.5	93.5
Buffalo	23.5	+23.5	90.5	90.5
Birmingham	12	+12	95	95
New England	45	+35	90	89
Cincinnati	70	+26	87	92
St. Louis	19	None	80	82
Detroit	32	None	88	86
Estimated national rate	16	+10.5	96	97.5

*Based on steelmaking capacities as of these dates.



COMPOSITE MARKET AVERAGES

	Feb. 23	Feb. 16	Feb. 9	One Month Ago Jan. 1946	Three Months Ago Nov. 1945	One Year Ago Feb. 1945	Five Years Ago Feb. 1941
Finished Steel	$58.27	$58.27	$58.27	$58.27	$58.27	$57.55	$56.73
Semifinished Steel	37.80	37.80	37.80	37.80	37.80	36.00	36.00
Steelmaking Pig Iron	24.80	24.80	24.80	24.80	24.25	23.55	22.05
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	20.05

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for last Month, Three Months and One Year Ago

Finished Material, cents per lb.; coke, dollars per net ton; others dollars per gross ton.

Finished Material	Feb. 23, 1946	Jan., 1946	Nov., 1945	Feb., 1945
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.15c
Steel bars, Philadelphia	2.57	2.57	2.57	2.47
Steel bars, Chicago	2.25	2.25	2.25	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.25	2.25	2.25	2.20
Plates, Philadelphia	2.30	2.30	2.30	2.25
Plates, Chicago	2.25	2.25	2.25	2.20
Sheets, hot-rolled, Pittsburgh	2.20	2.20	2.20	2.20
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.70	3.70	3.70	3.65
Sheets, hot-rolled, Gary	2.20	2.20	2.20	2.20
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.70	3.70	3.70	3.65
Hot-rolled Strip, Pittsburgh	2.10	2.10	2.10	2.10
Cold-rolled strip, Pittsburgh	2.80	2.80	2.80	2.80
Bright bess., basic wire, Pittsburgh	2.75	2.75	2.75	2.60
Wire nails, Pittsburgh	2.90	2.90	2.90	2.80
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$36.00	$36.00	$36.00	$34.00
Slabs, Pittsburgh, Chicago	36.00	36.00	36.00	34.00
Rerolling billets, Pittsburgh	36.00	36.00	36.00	34.00
Wire rods, No. 5 to ⅝-inch, Pitts.	2.15	2.15	2.15	2.00

Pig Iron	Feb. 23, 1946	Jan., 1946	Nov., 1945	Feb., 1945
Bessemer, del. Pittsburgh	$26.94	$26.94	$26.94	$25.69
Basic, Valley	25.25	25.25	25.25	24.00
Basic, eastern del. Philadelphia	27.09	27.09	27.09	25.84
No. 2 fdry., del. Pitts., N.&S. Sides	26.44	26.44	26.44	25.19
No. 2 foundry, Chicago	25.75	25.75	25.75	24.50
Southern No. 2, Birmingham	22.13	22.13	22.13	20.88
Southern No. 2 del. Cincinnati	26.05	26.05	26.05	24.80
No. 2 fdry., del. Philadelphia	27.59	27.59	27.59	26.34
Malleable, Valley	25.75	25.75	25.75	24.50
Malleable, Chicago	25.75	25.75	25.75	24.50
Lake Sup., charcoal del. Chicago	37.34	37.34	37.34	37.34
Gray forge, del. Pittsburgh	25.94	25.94	25.94	24.69
Ferromanganese, del. Pittsburgh	140.00	140.00	140.00	140.33
Scrap				
Heavy melting steel, No. 1, Pittsburgh	$20.00	$20.00	$20.00	$20.00
Heavy melt, steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke				
Connellsville, furnace ovens	$7.50	$7.50	$7.50	$7.00
Connellsville, foundry ovens	8.25	8.25	8.25	7.75
Chicago, by-product fdry., del.	13.35	13.75	13.75	13.35

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941, Feb. 4, 1942 and May 21, 1945. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. Seconds and off-grade products are also covered. Exceptions applying to individual companies are noted in the table. Finished steel quoted in cents per pound.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.

(Empire Sheet & Tin Plate Co., Mansfield, O. may quote carbon steel ingots at $33 gross ton, f.o.b. mill).

Alloy Steel Ingots: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon; uncrop, $45.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $36; Detroit, del. $38; Duluth (bll) $38; Pac. Ports, (bll) $48. (Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co., $41, Sterling, Ill.; Laclede Steel Co., $34 Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives. Granite City Steel Co. $47.50 gross ton slabs from D.P.C. mill. Geneva Steel Co. $58.64, Pac. ports.)

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $42, Detroit, del. $44; Duluth, billets, $44; forg. bil. f.o.b. Pac. ports, $54.

(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points; Follansbee Steel Corp., $49.50 f.o.b. Toronto, O. Geneva Steel Co. $64.64, Pacific ports.)

Open Hearth Shell Steel: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Youngstown, Birmingham, base 1000 tons one size and section; 3-12 in., $52; 12-18 in., excl., $54.00; 18-in. and over $56. Add $2.00 del. Detroit; $3.00 del. Eastern Mich.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54, del. Detroit $56, Eastern Mich. $57.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $36. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Point, Youngstown, Coatesville, lb., 1.90c.

Wire Rods: Pittsburgh; Chicago, Cleveland, Birmingham, 5—⅜ in. inclusive, per 100 lbs., $2.15 Do., over ⅜—41/64-in., incl., $2.30; Galveston, base, 2.25c and 2.40c respectively. Worcester add $0.10; Pacific ports $0.50 (Pittsburgh Steel Co., $0.05 higher.)

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3: Pittsburgh, Youngstown, Chicago Gary, Cleveland, Buffalo, Birmingham base 20 tons one size, 2.25c; Duluth, base 2.35c; Detroit, del. 2.35c; Eastern Mich. 2.40c; New York del. 2.59c; Phila. del. 2.57c; Gulf Ports, dock 2.62c; Pac. ports, dock 2.90c, (Calumet Steel Division. Borg-Warner Corp., and Joslyn Mfg. & Supply Co., may quote 2.55c, Chicago base; Sheffield Steel Corp., 2.75c, f.o.b. St. Louis.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem base 20 tons one size, 2.70c; Detroit del., 2.80c. (Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4300	1.70
2300	1.70	4600	1.20
2500	2.55	4800	2.15
3000	0.50	5100	0.35
3100	0.85	5130 or 5152	0.45
3200	1.35	6120 or 6152	0.95
3400	3.20	6145 or 6150	1.20
4000	0.45-0.55	8612	0.65
4100	(.15-.25 Mo) 0.70	8720	0.70
	(.20-.30 Mo) 0.75	9830	1.30

* Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.75c; Detroit 2.80c; Toledo 2.90c. (Keystone Drawn Steel Co. may sell outside its usual market area on Proc. Div., Treasury Dept. contracts at 2.65c, Spring City, Pa., plus freight on hot-rolled bars from Pittsburgh to Spring City, New England Drawn Steel Co. may sell outside New England on WPB directives at 2.65c, Mansfield, Mass., plus freight on hot-rolled bars from Buffalo to Mansfield.)

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.45c; Eastern Mich. 3.50c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c; Pacific ports, dock 2.55c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo base 2.15c; Detroit, del. 2.25c; Eastern Mich. and Toledo 2.30c; Gulf ports, dock 2.50c.

Iron Bars: Single refined, Pitts. 4.40c; double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, single ref., 5.00, double ref., 6.25c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.20c; Granite City, base 2.30c; Detroit del. 2.30c; Eastern Mich. 2.35c; Phila. del. 2.37c; New York del. 2.44c; Pacific ports 2.75c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O., base; Alan Wood Steel Co., Conshohocken, Pa., may quote 2.35c on hot carbon sheets, nearest eastern basing point.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; Eastern Mich. 3.20c; New York del. 3.39c; Phila. del. 3.37c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.70c; Granite City, base 3.80c; New York del. 3.94c; Phila. del. 3.78c; Pacific ports 4.25c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.36c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage not corrugated, copper alloy 3.60c; Granite City 3.70c; Pacific ports 4.25c; copper iron, 3.90c; pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh, 4.25c.

Enameling Sheets: 10-gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 2.85c; Granite City, base 2.95c; Detroit, del, 2.95c; eastern, Mich. 3.00c; Pacific ports 3.50c; 20 gage; Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base 3.45c; Detroit del. 3.55c; eastern Mich. 3.60c; Pacific ports 4.10c.

Electrical Sheets No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.30c	4.05c	3.40c
Armature	3.65c	4.40c	3.75c
Electrical	4.15c	4.90c	4.25c
Motor	5.05c	5.80c	5.15c
Dynamo	5.75c	6.50c	5.85c
Transformer			
72	6.25c	7.00c	....
65	7.25c	8.00c	....
58	7.75c	8.50c	....
52	8.55c	9.30c	....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Eastern Mich. 2.25c; Pacific ports 2.75c.

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Eastern Mich. 2.95c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Chicago 3.05c; Detroit del. 3.05c; Eastern Mich. 3.10c; Worcester base 3.35c.

Cold Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary. 100-lb. base box, $5.00; Granite City, Birmingham, Sparrows Point, $5.10.

Electrolytic Tin Plate: Pittsburgh, Gary, 100-lb. base box, 0.25 lb. tin, $4.35: 0.50 lb tin, $4.50; 0.75 lb. tin $4.65; Granite City, Birmingham, Sparrows Point, $4.45, $4.60, $4.75, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, Birmingham, Sparrows Point, 3.15c; Pacific ports, boxed, 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c; Pacific ports 4.55c.

Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City, Birmingham, Sparrows Point, $4.40.

Plates

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I. C. 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16; 30-lb. $17.25; 40-lb. $19.50.

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.25c; New York, del. 2.44c; Phila., del. 2.30c; St. Louis, 2.49c; Boston, del. 2.57-82c; Pacific ports, 2.80c; Gulf ports, 2.60c.

(Granite City Steel Co. may quote carbon plates 2.35c f.o.b. mill; 2.65c f.o.b. D.P.C. mill; Central Iron & Steel Co. 2.50c f.o.b. basing points; Geneva Steel Co., Provo, Utah, 3.20c f.o.b. Pac. ports.)

Floor Plates: Pittsburgh, Chicago, 3.50c; Pacific ports, 4.15c; Gulf ports, 3.85c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c; Gulf ports 3.95c; Pacific ports 4.15c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del. 2.27c; Phila., del. 2.215c; Pacific ports. 2.75c; Gulf ports, 2.45c.

(Phoenix Iron Co., Phoenixville, Pa., may quote the equivalent of 2.45c, Bethlehem, Pa., on the general range and 2.55c on beams and channels from 4 to 10 inches.)

Steel Piling: Pittsburgh, Chicago, Buffalo, 2.40c; Pacific ports, 2.95c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham to manufacturers in carloads.

Bright, basic, bessemer wire ..... •$2.75
Spring wire ..... •†$3.35

Wire Products to the Trade:

Standard and cement-coated wire nails, and staples, 100-lb. keg, Pittsburgh, Chicago, Birmingham, Cleveland, $2.90; Worcester, $3.20; Pac. ports, $3.40; galvanized, $2.55 and $3.05, resp.

Annealed Merchant quality wire, 100-lb., Pittsburgh, Chicago, Cleveland, Birmingham ..... ††$3.20

Galvanized Merchant quality wire, 100-lb., Pittsburgh, Chicago, Cleveland, Birmingham ..... ††$3.55

Woven fence, 15½ gage and heavier, per base column 67

Barbed wire, 80-rod spool, Pittsburgh, Chicago, Cleveland, Birmingham, column 72; twisted barbless wire, column 72.

•Add $0.10 for Worcester, $0.05 for Duluth; add $0.50 for bright, annealed, galvanized and $0.70 for other finishes for Pacific ports.

ADJUSTMENTS PEND

Under Office of Stabilization Administration directive, dated Feb. 15, 1946, steelmakers are permitted to deliver carbon and alloy steel products at existing maximum prices, such prices to be subject to later upward revision following determination of specific product prices by the Office of Price Administration, determined upon in applying the adjustable $5 per ton price increase allowed by the OSA as of Feb. 15. Prices quoted on these pages are subject to revision in accordance with specific product price determinations by OPA.

†Same bases as for bright basic except Birmingham.

††Add 10 cents for Worcester; 50 cents for annealed, bright basic and 70 cents for all other finishes for Pacific ports.

Tubular Goods

Welded Pipe: Base price in carloads, threaded and coupled to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

Steel In.	Blk.	Galv.	Iron In.	Blk.	Galv.
⅛	56	33	½	24	3½
¼ & ⅜	59	40½	⅝	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

Steel In.	Blk.	Galv.	Iron In.	Blk.	Galv.
2	61	49½	1¼	23	3½
2½-3	64	54½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½-3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	.....	$ 9.01	.....	.....
1¼"	13	.....	10.67	.....	.....
1½"	13	$10.23	11.72	$ 9.72	23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $43.00. Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $45.00.

•Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $31-$33.

Supplies: Track bolts, 4.75c; heat treated. 5.00c. Tie plates $46 net ton, base, Standard spikes, 3.25c.

•Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb.; Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c

Tung	Chr.	Van.	Moly.	Base, per lb.
18.00	4	1	...	67.00c
1.5	4	1	8.5	54.00c
....	4	2	3	54.00c
6.40	4.15	1.90	5	57.50c
5.50	4.50	4	4.50	70.00c

Rivets, Washers

Birmingham

F.o.b. Pittsburgh, Cleveland, Chicago

Structural	3.75c
⅞-inch and under	65.-5 off
Wrought, Washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75.-3.00 off

Stainless Steels

Base, Cents per lb.

CHROMIUM NICKEL STEEL

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
•316	40.00	44.00	48.00	40.00	48.00
‡321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50

STRAIGHT CHROMIUM STEEL

403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.60	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	30.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
440A	24.00	28.50	33.50	23.75	30.50
442	22.50	25.50	32.50	24.00	32.00
443	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

STAINLESS CLAD STEEL (20%)

304	§§18.00	19.00	.....	.....

•With 2-3% moly. ‡With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅞ and ⅝ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex	U.S.S.	S.A.E.
⅞-inch and less	62	64
½-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10 smaller	70 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	•7.50
Connellsville, foundry	8.00- 8.50
New River, foundry	9.00- 9.25
Wise county, foundry	7.75- 8.25
Wise county, furnace	7.25- 7.75

By-Product Foundry

Kearney, N. J., ovens	13.05
Chicago, outside delivered	13.00
Chicago, delivered	13.75
Terre Haute, delivered	13.50
Milwaukee, ovens	13.75
New England, delivered	14.65
St. Louis, delivered	†18.75
Birmingham, delivered	10.90
Indianapolis, delivered	13.50
Cincinnati, delivered	13.25
Cleveland, delivered	13.20
Buffalo, delivered	13.40
Detroit, delivered	13.75
Philadelphia, delivered	13.28

•Operators of hand-drawn ovens using trucked coal may charge $8.00; effective May 26, 1945.

†14.25 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.23c
Do., tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

WAREHOUSE STEEL PRICES

Base delivered price, cents per pound, for delivery within switching limits, subject to established extras.

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold-rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	NE hot bars 8600 series	NE hot bars 9400 series
Boston	4.044[1]	3.912[1]	3.912[1]	5.727[1]	3.774[1]	4.106[1]	5.106[1]	5.224[14]	4.744[14]	4.244[11]	4.715	6.012[23]	6.012[23]
New York	3.853[1]	3.758[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[14]	4.203[21]	4.774	.....	.....
Jersey City	3.853[1]	3.747[1]	3.768[1]	5.574[1]	3.590[1]	3.974[1]	3.974[1]	5.010[13]	4.613[14]	4.203[21]	4.774	.....	.....
Philadelphia	3.822[1]	3.666[1]	3.605[1]	5.272[1]	3.518[1]	3.922[1]	4.272[1]	5.018[15]	4.872[25]	4.172[21]	4.772	5.816[23]	5.860[23]
Baltimore	3.802[1]	3.759[1]	3.594[1]	5.252[1]	3.394[1]	3.902[1]	4.252[1]	4.894[1]	4.852[25]	4.152[21]	.....	.....	.....
Washington	3.941[1]	3.930[1]	3.796[1]	5.341[1]	3.596[1]	4.041[1]	4.391[1]	5.196[17]	4.841[20]	4.141[21]	.....	.....	.....
Norfolk, Va.	4.065[1]	4.002[1]	3.971[1]	5.465[1]	3.771[1]	4.165[1]	4.515[1]	5.371[17]	4.965[24]	4.265[21]	.....	.....	.....
Bethlehem, Pa.*	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Claymont, Del.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Coatesville, Pa.*	.....	.....	3.45[1]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo (city)	3.35[1]	3.40[1]	3.63[1]	5.26[1]	3.35[1]	3.819[1]	3.819[1]	4.75[15]	4.40[10]	3.85[21]	4.669	5.60[23]	5.75[23]
Buffalo (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.81[1]	3.50[1]	4.65[15]	4.30[10]	3.75[21]	4.35	5.60[23]	5.75[23]
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[13]	4.40[24]	3.85[21]	.....	.....	.....
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[13]	4.30[24]	3.75[21]	.....	.....	.....
Cleveland (city)	3.35[1]	3.588[1]	3.40[1]	5.188[1]	3.35[1]	3.60[1]	3.60[1]	4.877[13]	4.40[24]	3.85[21]	4.45[21]	5.60[23]	5.65[23]
Cleveland (country)	3.25[1]	.....	3.30[1]	.....	3.25[1]	3.50[1]	3.50[1]	.....	4.30[24]	3.75[21]	4.35[21]	.....	.....
Detroit	3.450[1]	3.661[1]	3.609[1]	5.281[1]	3.450[1]	3.700[1]	3.700[1]	5.000[12]	4.500[26]	3.900[21]	4.659	5.93[22]	5.93[23]
Omaha (city, delivered)	4.043[1]	4.093[1]	4.093[1]	5.693[1]	3.793[1]	4.143[1]	4.143[1]	5.615[13]	5.443[24]	4.543[12]	.....	.....	.....
Omaha (country, base)	3.943[1]	3.993[1]	3.993[1]	5.593[1]	3.693[1]	4.043[1]	4.043[1]	5.515[12]	.....	.....	.....	.....	.....
Cincinnati	3.611[1]	3.691[1]	3.661[1]	5.291[1]	3.425[1]	3.675[1]	3.675[1]	4.825[12]	4.475[24]	4.111[21]	4.711	6.10	6.20
Youngstown, O.*	.....	.....	.....	.....	.....	.....	.....	4.40[13]	.....	.....	.....	.....	.....
Middletown, O.*	.....	.....	.....	.....	3.25[1]	3.50[1]	3.50[1]	4.65[16]	.....	.....	.....	.....	.....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	5.231[15]	4.20[24]	3.85[21]	4.65	5.75[23]	5.85[23]
Milwaukee	3.637[1]	3.687[1]	3.687[1]	5.287[1]	3.387[1]	3.737[1]	3.737[1]	5.272[15]	4.337[24]	3.987[21]	4.787	5.987[23]	6.087[23]
Indianapolis	3.58[1]	3.63[1]	3.63[1]	5.23[1]	3.518[1]	3.768[1]	3.768[1]	4.918[15]	4.568[24]	4.08[21]	4.78	6.08[22]	6.18[22]
St. Paul	3.76[2]	3.81[2]	3.81[2]	5.41[3]	3.51[2]	3.86[3]	3.86[2]	5.257[15]	4.46[24]	4.461[21]	5.102	6.09[22]	6.19[22]
St. Louis	3.647[1]	3.697[1]	3.697[1]	5.297[1]	3.397[1]	3.747[1]	3.747[11]	5.172[15]	4.347[24]	4.131[21]	4.931	6.131[23]	6.281[23]
Memphis, Tenn.	4.015[5]	4.065[5]	4.065[5]	5.78[5]	3.965[5]	4.215[5]	4.215[5]	5.265[15]	4.78[24]	4.43[21]	.....	.....	.....
Birmingham	3.50[1]	3.55[1]	3.55[1]	5.903[1]	3.45[1]	3.70[1]	3.70[1]	4.75[15]	4.852[24]	4.64	5.215	.....	.....
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	4.058[4]	4.20[4]	4.20[4]	5.25[26]	5.079[10]	4.70[21]	5.429	.....	.....
Houston, Tex.	3.75[3]	4.25[1]	4.25[1]	5.50[3]	3.763[3]	4.313[3]	4.313[3]	5.313[26]	5.594[10]	3.75[21]	.....	.....	.....
Los Angeles	4.40[4]	4.65[4]	4.95[4]	7.20[4]	5.00[4]	4.95[4]	6.75[4]	6.00[12]	7.20[6]	5.683[22]	5.613	5.85[23]	5.95[23]
San Francisco	4.15[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	5.75[7]	6.35[15]	7.30[16]	5.433[21]	7.333	8.304[23]	8.404[23]
Portland, Oreg.	4.45[27]	4.45[27]	4.75[27]	6.50[27]	4.65[27]	4.75[27]	6.30[27]	5.75[15]	6.60[15]	5.633[15]	.....	.....	.....
Tacoma	4.35[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.95[15]	7.60[15]	5.883[21]	.....	.....	8.00[23]
Seattle	4.35[8]	4.45[6]	4.75[8]	6.50[8]	4.65[6]	4.25[6]	5.45[8]	5.95[15]	7.05[15]	5.883[21]	.....	.....	8.00[23]

*Basing point cities with quotations representing mill prices, plus warehouse spread.

NOTE—All prices fixed by Office of Price Administration in Amendments Nos. 10 to 33 to Revised Price Schedule No. 49. Deliveries outside above cities computed in accordance with regulations.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 8999 pounds; [6]—300 to 9999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, 2000 to 39,999 pounds, base; [27]—300 to 4999 pounds.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$4.95
Mesabi nonbessemer	4.55
High phosphorus	4.55
Mesabi bessemer	4.70
Old range nonbessemer	4.80

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	18.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Swedish basic, 60 to 68%	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00

Tungsten Ore

Chinese Wolframite, per short ton unit, duty paid	$24.00

Chrome Ore

(Equivalent OPA schedules):

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not net.)

Indian and African

48% 2.8:1	$39.75
48% 3:1	41.00
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80

Brazilian—nominal

44% 2.5:1 lump	33.65
48% 3:1 lump	43.50

Rhodesian

45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	41.00

Domestic (seller's nearest rail)

48% 3:1	52.80

less $7 freight allowance.

Manganese Ore

Sales prices of Metals Reserve Co., cents per gross ton unit, dry, 48%, at New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans, 85.0c; Fontana, Calif., Provo, Utah, and Pueblo, Colo., 91.0c; prices include duty on imported ore and are subject to premiums, penalties and other provisions of amended M.P.R. No. 248, effective as of May 15. Price at basing points which are also points of discharge of imported manganese ore is f.o.b. cars, shipside, at dock most favorable to the buyer. Outside shipments direct to consumers at 10c per unit less than Metal Reserve Co. prices.

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

(Extras for alloy content)

Designation	Chemical Composition Limits, Per Cent — Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Electric furnace: Bars per 100 lb.	Billets per GT	Bars per 100 lb.	Billets per GT
NE 9415	.13-.18	.80-1.10	.20-.35	.30-.50	.30-.60	.08-.15	$0.75	$15.00	$1.25	$25.00
NE 9425	.23-.28	.80-1.20	.20-.35	.30-.50	.30-.60	.08-.15	.75	15.00	1.25	25.00
NE 9442	.40-.45	1.00-1.30	.20-.35	.30-.50	.30-.60	.08-.15	.80	16.00	1.30	26.00
NE 9722	.20-.25	.50-.80	.20-.35	.10-.25	.40-.70	.15-.25	.65	13.00	1.15	23.00
NE 9912	.10-.15	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00
NE 9920	.18-.23	.50-.70	.20-.35	.40-.60	1.00-1.30	.20-.30	1.20	24.00	1.55	31.00

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

Pig Iron

Prices (in gross tons) are maximum fixed by OPA Price Schedule No. 10, effective June 10, 1941, amended Feb. 14, and Oct. 22, 1945. Exceptions indicated in footnotes. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included.

	Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$26.75	$26.25	$27.75	$27.25
Newark, N. J., del.	28.28	27.78	29.28	28.78
Brooklyn, N. Y., del.	29.25	.....	.....	29.75
Birdsboro, Pa., base	26.75	26.25	27.75	27.25
Birmingham, base	22.13	20.75	26.75	.....
Baltimore, del.	27.36	.....	.....	.....
Boston, del.	26.89	.....	.....	.....
Chicago, del.	25.97	.....	.....	.....
Cincinnati, del.	25.81	24.48	.....	.....
Cleveland, del.	25.87	24.99	.....	.....
Newark, N. J.	27.90	.....	.....	.....
Philadelphia, del.	27.21	26.71	.....	.....
St. Louis, del.	25.87	24.99	.....	.....
Buffalo, base	25.75	24.75	26.75	26.25
Boston, del.	27.25	26.75	28.25	27.75
Rochester, del.	27.28	.....	28.28	27.78
Syracuse, del.	27.83	.....	28.83	28.33
Chicago, base	25.75	25.25	26.25	25.75
Milwaukee, del.	26.85	26.35	27.35	26.85
Muskegon, Mich., del.	28.94	.....	.....	28.94
Cleveland, base	25.75	25.25	26.25	25.75
Akron, Canton, del.	27.14	26.64	27.64	27.14
Detroit, base	25.75	25.25	26.25	25.75
Saginaw, Mich., del.	28.06	27.56	28.56	28.06
Duluth, base	26.25	25.75	26.75	26.25
St. Paul, del.	28.38	27.88	28.88	28.38
Erie, Pa., base	25.75	25.25	26.75	26.25
Everett, Mass., base	26.75	26.25	27.75	27.25
Boston, del.	27.25	26.75	28.25	27.75
Granite City, Ill., base	25.75	25.25	26.25	25.75
St. Louis, del.	26.25	25.75	.....	26.25
Hamilton, O., base	25.75	25.25	.....	25.75
Cincinnati, del.	26.19	26.36	.....	26.86
Neville Island, Pa., base	25.75	25.25	26.25	25.75
‡Pittsburgh, del. No. & So. sides	26.44	25.94	26.94	26.44
Provo, Utah, base	23.75	23.25	.....	.....
Sharpsville, Pa., base	25.75	25.25	26.25	25.75
Sparrows Point, base	26.75	26.25	.....	.....
Baltimore, del.	27.74	.....	.....	.....
Steelton, Pa., base	.....	26.25	.....	.....
Swedeland, Pa., base	26.75	26.25	27.75	27.25
Philadelphia, del.	27.59	27.09	.....	28.09
Toledo, O., base	25.75	25.25	26.25	25.75
Youngstown, O., base	25.75	25.25	26.25	25.75
Mansfield, O., del.	27.69	27.19	28.19	27.69

Base grade, silicon 1.75-2.25%; add 50 cents for each additional 0.25% silicon, or portion thereof; deduct 50 cents for silicon below 1.75% on foundry iron. ‡For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenbridge 1.24

Note: Add 50 cents per ton for each 0.50% manganese or portion thereof over 1.00%.

Nickel differentials: Under 0.50%, no extra; 0.50% to 0.74% incl., $2 per ton; for each additional 0.25% nickel, $1 per ton.

High Silicon, Silvery

6.00-6.50 per cent (base)			$31.25
6.51-7.00	$32.25	9.01- 9.50	37.25
7.01-7.50	33.25	9.51-10.00	38.25
7.51-8.00	34.25	10.01-10.50	39.25
8.01-8.50	35.25	10.51-11.00	40.25
8.51-9.00	36.25	11.01-11.50	41.25

F.o.b. Jackson county, O., per gross ton. Buffalo base $1.25 higher, whichever is most favorable to buyer. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Electric Furnace Ferrosilicon: Sil. 14.01 to 14.50%, $45.50 Jackson Co.; each additional .50% silicon up to and including 18% add $1; low impurities not exceeding 0.005 Phos., 0.40 Sulphur, 1.0% Carbon, add $1.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Charcoal Pig Iron

Northern

Lake Superior Furn. $34.00
Chicago, del. 37.34

Southern

Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. $33.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $25.25
Valley base 25.25

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo, N. Y., $31.25 base; $32.49, del. Philadelphia. Intermediate phos., Central Furnace, Cleveland, $28.25.

Switching Charges: Basing Point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differential: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorus Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorus content of 0.70% and over.

Ceiling Prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky. $68.50

First Quality

Pa., Ill., Md., Mo., Ky.	54.40
Alabama, Georgia	54.40
New Jersey	50.35
Ohio	47.70

Second Quality

Pa., Ill., Md., Mo., Ky.	49.35
Alabama, Georgia	49.30
New Jersey	52.00
Ohio	38.15

Malleable Bung Brick

All bases 63.45

Silica Brick

Pennsylvania	54.40
Joliet, E. Chicago	62.45
Birmingham, Ala.	54.40

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press	32.90
Wire Cut	30.90

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk 22.00
net ton, bags 26.00

Basic Brick

net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded Magnesite	65.00

Fluorspar

Metallurgical grade, f.o.b. Ill., Ky., net tons, carloads, CaF_2 content, 70% or more, $33; 65 but less than 70%, $32; 60 but less than 65% $31; less than 60%, $30. After Aug. 29 base price any grade $30.00 war chemicals.

Ferroalloy Prices

Ferromanganese (standard) 78-82% c.l. gross ton, duty paid, $135 f.o.b. cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer; Rockdale or Rockwood, Tenn.; where Tennessee Products Co. is producer; Birmingham, Ala., where Sloss-Sheffield Steel & Iron Co. is producer; $140 f.o.b. cars, Pittsburgh, where Carnegie-Illinois Steel Corp. is producer; add $6 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese (Low and Medium Carbon); per lb. contained manganese; eastern zone, low carbon, bulk, c.l., 23c; 2000 lb. to c.l., 23.40c; medium, 14.50c and 15.20c; central, low carbon, bulk, c.l., 23.30c; 2000 lb. to c.l., 24.40c; medium 14.80c and 16.20c; western, low carbon, bulk, c.l., 24.50c, 2000 lb. to c.l., 25.40c; medium, 15.75c and 17.20c; f.o.b. shipping point, freight allowed.

Spiegeleisen: 19-21% carlots per gross ton, Palmerton, Pa., $36; Pittsburgh, $40.50; Chicago, $40.60.

Electrolytic Manganese: 99.9% plus, less ton lots, per lb. 37.6 cents.

Chromium Metal: 97% min. chromium, max. .50% carbon, eastern zone, per lb. contained chromium bulk, c.l., 79.50c, 2000 lb. to c.l. 80c; central 81c and 82.50c; western 82.25c and 84.75c; f.o.b. shipping point, freight allowed.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: High carbon, eastern zone, bulk, c.l., 13c, 2000 lb. to c.l. 13.90c; central, add .40c and .65c; western, add 1c and 1.85c—high nitrogen, high carbon ferrochrome; Add 5c to all high carbon ferrochrome prices; all zones; low carbon eastern, bulk, c.l. max. 0.06% carbon, 23c, 0.10% 22.50c, 0.15% 22c, 0.20% 21.50c, 0.50% 21c, 1.00% 20.50c, 2.00% 19.50c; 2000 lb. to c.l., 0.06% 24c, 0.10% 23.50c, 0.15% 23c, 0.20% 22.50c, 0.50% 22c, 1.00% 21.50c, 2.00% 20.50c; central, add .4c for bulk, c.l. and .65 for 2000 lb. to c.l.; western, add 1c for bulk, c.l. and 1.85c for 2000 lb. c.l.; carload packed differential .45c; f.o.b. shipping point, freight allowed. Prices per lb. contained Cr high nitrogen, low carbon ferrochrome: Add 2c to low carbon ferrochrome prices; all zones. For higher nitrogen carbon add 2c for each .25% of nitrogen over 0.75%.

Special Foundry ferrochrome: (Chrom. 62-66%, car. approx. 5-7%) Contract, carload, bulk 13.50c, packed 13.95c, ton lots 14.40c, less, 14.90c, eastern, freight allowed, per pound contained chromium; 13.90c, 14.35c, 15.05c and 15.55c central; 14.50c, 14.95c, 16.25c and 16.75c, western; spot up .25c.

S.M. Ferrochrome, high carbon: (Chrom: 60-65%, sil. 4-6%, mang. 4-6% and carbon 4-6%.) Contract, carlot, bulk, 14.00c, packed 14.45c, ton lots 14.90c, less 15.40c, eastern, freight allowed; 14.40c, 14.85c, 15.55c and 16.05c, central; 15.00c, 15.45c, 16.75c and 17.25c, western; spot up .25c; per pound contained chromium.

S.M. Ferrochrome, low carbon: (Chrom. 62-66%, sil. 4-6%, mang. 4-6% and carbon 1.25% max.) Contract, carlot, bulk, 20.00c, packed 20.45c, ton lots 21.00c, less ton lots 22.00c, eastern, freight allowed, per pound contained chromium, 20.40c, 20.85c, 21.65c and 22.65c, central; 21.00c, 21.45c, 22.85c and 23.85c, western; spot up .25c.

SMZ Alloy: (Silicon 60-65%, Mang. 5-7%, zir. 5-7% and iron approx. 20%) per lb. of alloy contract carlots 11.50c, ton lots 12.00c, less 12.50c, eastern zone, freight allowed; 12.00c, 12.85c and 13.35c central zone; 14.05c, 14.60c and 15.10c, western; spot up .25c.

Silcas Alloy: (Sil. 35-40%, cal. 9-11%, alum. 6-8%, zir. 3-5%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy contract, carlots 25.00c, ton lots 26.00c, less ton lots 27.00c, eastern, freight allowed, 25.50c, 26.75c and 27.75c, central; 27.50c, 28.90c and 29.90c, western; spot up .25c.

Silvaz Alloy: (Sil. 35-40%, van. 9-11%, alum. 5-7%, zir. 5-7%, tit. 9-11% and boron 0.55-0.75%), per lb. of alloy. Contract, carlots 58.00c, ton lots 59.00c, less 60.00c, eastern, freight allowed; 58.50c, 59.75c and 60.75c, central; 60.50c, 61.90c and 62.90c, western; spot up ¼c.

CMSZ Alloy 4: (Chr. 45-49%, mang. 4-6%, sil. 18-21%, zir. 1.25-1.75%, and car. 3.00-4.50%). Contract carlots, bulk, 11.00c and packed 11.50c; ton lots 12.00c; less 12.50c, eastern, freight allowed; 11.50c and 12.00c, 12.75c, 13.25c, central; 13.50c and 14.00c, 14.75c, 15.25c, western; spot up .25c.

CMSZ Alloy 5: (Chr. 50-56%, mang. 4-6%, sil. 13.50-16.00%, zir. .75-1.25%. car. 3.50-5.00%) per lb. of alloy. Contract, carlots, bulk, 10.75c, packed 11.25c, ton lots 11.75c, less 12.25c, eastern, freight allowed; 11.25c, 11.75c and 12.50c, central; 13.25c and 13.75c, 14.50c and 15.00c, western; spot up .25c.

Ferro-Boron: (Bor. 17.50% min., sil. 1.50% max., alum. 0.50% max. and car. 0.50% max.) per lb. of alloy contract ton lots, $1.20, less ton lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Manganese-Boron: (Mang. 75% approx., boron 15-20%, iron 5% max. sil. 1.50% max. and carbon 3% max.), per lb. of alloy. Contract ton lots, $1.89, less $2.01, eastern; freight allowed; $1.903 and $2.023, central, $1.935 and $2.055 western; spot up 5c.

Nickel-Boron: (Bor. 15-18%, alum. 1% max., sil. 1.50% max., car. 0.50% max., iron 3% max., nickel, balance), per lb. of alloy. Contract, 5 tons or more, $1.90, 1 ton to 5 tons, $2.00, less than ton $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Chromium-Copper: (Chrom. 8-11%, cu. 88-90%, iron 1% max. sil. 0.50% max.) contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Vanadium Oxide: (Fused: Vanadium oxide 85-88%, sodium oxide approx. 10% and calcium oxide, approx. 2%, or Red Cake; Vanadium oxide 85% approx., sodium oxide, approx. 9% and water approx.

2.5%) Contract, any quantity, $1.10 eastern, freight allowed per pound vanadium oxide contained; contract cariots, $1.105, less cariots, $1.105, central; $1.118 and $1.133, western; spot add 5c to contracts in all cases.

Calcium metal; cast: Contract ton lots or more $1.35, less, $1.60, pound of metal; $1.36 and $1.61 central, $1.40 and $1.65, western; spot up 5c.

Calcium-Manganese-Silicon: (Cal. 16-20% mang. 14-18% and sil. 53-59%), per lb. of alloy. Contract, cariots, 15.50c, ton lots 16.50c and less 17.00c, eastern, freight allowed; 16.00c, 17.35c, and 17.85c, central; 18.05c, 19.10c and 19.60c western; spot up .25c.

Calcium-Silicon: (Cal. 30-35%, sil. 60-65% and iron 3.00% max.), per lb. of alloy. Contract, cariot, lump 18.00c, ton lots 14.50c, less 15.50c, eastern, freight allowed; 13.50c, 15.25c and 16.25c central; 15.55c, 17.40c and 18.40c, western; spot up .25c.

Briquets, Ferromanganese: (Weight approx. 3 lbs. and containing exactly 2 lbs. mang.) per lb. of briquets. Contract, cariots, bulk .0605c, packed .063c, tons .0655c, less .068c eastern freight allowed; .063c, .0655c, .0755c and .078c, central; .068c, .0685c, .0855c, and .088c, western; spot up .25c.

Briquets: Ferrochrome, containing exactly 2 lb. cr., eastern zone, bulk, c.l., 8.25c per lb. of briquets, 2000 lb. to c.l., 8.75c; central, add .3c for c.l. and .5c for 2000 lb. to c.l.; western, add .70c for c.l., and .2c for 2000 lb. to c.l.; **silicomanganese,** eastern, containing exactly 2 lb. manganese and approx. ½ lb. silicon, bulk, c.l., 5.80c, 2000 lbs. to c.l., 6.30c; central, add .25c for c.l. and 1c for 2000 lb. to c.l.; western, add .5c for c.l., and 2c for 2000 lb. to c.l.; **ferrosilicon,** eastern, approx. 5 lb., containing exactly 2 lb. silicon, or weighing approx. 2½ lb. and containing exactly 1 lb. of silicon, bulk, c.l., 3.35c, 2000 lb. to c.l., 3.80c; central, add 1.50c for c.l., and .40c for 2000 lb. to c.l.; western, add 3.0c for c.l. and .45c for 2000 to c.l.; f.o.b. shipping point, freight allowed.

Ferromolybdenum: 55-75% per lb. contained molybdenum f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Eastern zone, 90-95%, bulk, c.l., 11.05c, 2000 lb. to c.l., 12.30c; 80-90%, bulk c.l., 8.90c, 2000 lb. to c.l., 9.95c; 75%, bulk, c.l., 8.05c, 2000 lb. to c.l., 9.05c; 50%, bulk c.l., 6.65c and 2000 lb. to c.l., 7.85c; central 90-95%, bulk, c.l., 11.20c, 2000 lb. to c.l., 12.80c; 80-90%, bulk, c.l., 9.05c, 2000 to c.l., 10.45c; 75%, bulk, c.l., 8.20c, 2000 lb. to c.l., 9.65c; 50% bulk, c.l., 7.10c, 2000 lb. to c.l., 9.70c; western, 90-95%, bulk, c.l., 11.65c, 2000 lb. to c.l., 15.60c; 80-90%, bulk, c.l., 9.55c, 2000 lb. to c.l., 13.50c; 75%, bulk, c.l., 8.75c, 2000 to c.l., 13.10c; 50%, bulk, c.l., 7.25c, 2000 to c.l., 8.75c; f.o.b. shipping point, freight allowed. Prices per lb. contained silicon.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all f.o.b. Bridgeville, Pa., usual freight allowance.

Silicon Metal: Min. 97% silicon and max. 1% iron, eastern zone, bulk, c.l., 12.90c; 2000 lb. to c.l., 13.45c; central, 13.20c and 13.90c; western, 13.85c and 16.80c; min. 96% silicon and max. 2% iron, eastern, bulk, c.l., 12.50c, 2000 lb. to c.l., 13.10c; central, 12.80c and 13.55c; western, 13.45c and 16.50c f.o.b. shipping point, freight allowed. Price per lb. contained silicon.

Manganese Metal: (96% min. manganese, max. 2% iron), per lb. of metal, eastern zone, bulk, c.l., 30c, 2000 lb. to c.l., 32c, central, 30.25c, and 33c; western 30.55c and 35.05c.

Ferrotungsten: Spot, 10,000 lb. or more, per lb. contained tungsten, $1.90; contract, $1.88; freight allowed as far west as St. Louis.

Tungsten Metal Powder: Spot, not less than 97 per cent, $2.50-$2.60; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb. contained titanium; ton lots $1.23; less-ton lots $1.25; eastern. Spot up 5 cents per lb.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40 eastern. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20% contract basis, per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi River and North of Baltimore and St. Louis, 6.8% carbon $142.50; 3-5% carbon $157.50.

Carbortam: Boron 0.90 to 1.15% net ton to carload, 8c lb. f.o.b. Suspension Bridge, N. Y., frt. allowed same as high-carbon ferrotitanium.

Bortam: Boron 1.5-1.9%, ton lots 45c lb., less ton lots 50c lb.

Ferrovanadium: 35-55%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Zirconium Alloys: 12-15%, per lb. of alloy, eastern contract, cariots, bulk, 4.60c, packed 4.80c, ton lots 4.80c, less tons 5c, carloads, bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot ¼c per ton higher.

Zirconium Alloy: 35-40%, Eastern, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼ cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) contract basis f.o.b. Niagara Falls, N. Y., per lb. 5.75c; ton lots 6.50c. Spot ½ cent higher.

Siminal: (Approx. 20% each si., Mn., Al.) Contract, frt. all. not over St. Louis rate, per lb. alloy; carlots 8c; ton lots 8.75c; less ton lots 9.25c.

Borosil: 3 to 4% boron, 40 to 45% Si., $6.25 lb. cont. Bo., f.o.b. Philo O., freight not exceeding St. Louis rate allowed.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Following prices are quotations developed by editors of STEEL in the various centers. For complete OPA ceiling price schedule refer to page 156 of Sept. 4, 1944, issue of STEEL. Quotations are on gross tons.

PHILADELPHIA:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.75
No. 2 Heavy Melt. Steel	18.75
No. 2 Bundles	18.75
No. 3 Bundles	16.75
Mixed Borings, Turnings	13.75
Machine Shop Turnings	13.75
Billet, Forge Crops	23.75
Bar Crops, Plate Scrap	21.25
Cast Steel	21.25
Punchings	21.25
Elec. Furnace Bundles	19.75
Heavy Turnings	18.25

Cast Grades

(F.o.b. Shipping Point)

Heavy Breakable Cast	16.50
Charging Box Cast	19.00
Cupola Cast	20.00
Unstripped Motor Blocks	17.50
Malleable	22.00
Chemical Borings	16.51

NEW YORK:

(Dealers' buying prices)

No. 1 Heavy Melt. Steel	$15.33
No. 2 Heavy Melt. Steel	15.33
No. 2 Hyd. Bundles	15.33
No. 3 Hyd. Bundles	13.33
Chemical Borings	14.33
Machine Turnings	10.33
Mixed Borings, Turnings	10.33
No. 1 Cupola	20.00
Charging Box	19.00
Heavy Breakable	16.50
Unstrip Motor Blocks	17.50
Stove Plate	19.00

CLEVELAND:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
No. 1 Comp. Bundles	19.50
No. 2 Comp. Bundles	19.50
No. 1 Busheling	19.50
Mach. Shop Turnings	14.50
Short Shovel Turnings	16.50
Mixed Borings, Turnings	14.50
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	13.50-14.00
Billet, Bloom Crops	24.50
Sheet Bar Crops	22.00
Plate Scrap, Punchings	22.00
Elec. Furnace Bundles	20.50

BOSTON:

(F.o.b. shipping points)

No. 1 Heavy Melt. Steel	$14.06
No. 2 Heavy Melt. Steel	14.06
No. 1 Bundles	14.06
No. 2 Bundles	14.06
No. 1 Busheling	14.06
Machine Shop Turnings	9.06
Mixed Borings, Turnings	9.06
Short Shovel Turnings	11.06
Chemical Borings	13.31
Low Phos. Clippings	16.56
No. 1 Cast	20.00
Clean Auto Cast	20.00
Stove Plate	19.00
Heavy Breakable Cast	16.50

Boston Differential 99 cents higher, steel-making grades; Providence $1.09 higher.

PITTSBURGH:

(Delivered consumer's plant)

Railroad Heavy Melting	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
No. 2 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Mach. Shop Turnings	15.00
Mixed Borings, Turnings	15.00
No. 1 Cupola Cast	20.00
Heavy Breakable Cast	16.50
Cast Iron Borings	16.00
Billet, Bloom Crops	25.00
Sheet Bar Crops	22.50
Plate Scrap, Punchings	22.50
Railroad Specialties	24.50
Scrap Rail	21.50
Axles	26.00
Rail 3 ft. and under	23.50
Railroad Malleable	22.00

VALLEY:

(Delivered consumer's plant)

No. 1 R.R. Heavy Melt.	$21.00
No. 1 Heavy Melt. Steel	20.00
No. 1 Comp. Bundles	20.00
Short Shovel Turnings	17.00
Cast Iron Borings	16.00
Machine Shop Turnings	15.00
Low Phos. Plate	22.50

MANSFIELD, O:

(Delivered consumer's plant)

Machine Shop Turnings	$15.00

BIRMINGHAM:

(Delivered consumer's plant)

Billet Forge Crops	$22.00
Structural, Plate Scrap	19.00
Scrap Rails Random	18.50
Rerolling Rails	20.50
Angle Splice Bars	20.50
Solid Steel Axles	24.00
Cupola Cast	20.00
Stove Plate	19.00
Long Turnings	8.50- 9.00
Cast Iron Borings	8.50- 9.00
Iron Car Wheels	16.50-17.00

CHICAGO:

(Delivered consumer's plant)

No. 1 R.R. Heavy Melt.	$19.75
No. 1 Heavy Melt. Steel	18.75
No. 2 Heavy Melt. Steel	18.75
No. 1 Ind. Bundles	18.75
No. 2 Dlr. Bundles	18.75
Baled Mach. Shop Turn.	18.75
No. 3 Galv. Bundles	16.75
Machine Turnings	13.75
Mix. Borings, Sht. Turn.	13.75
Short Shovel Turnings	15.75
Cast Iron Borings	14.75
Scrap Rails	20.25
Cut Rails, 3 feet	22.25
Cut Rails, 18-inch	23.50
Angles, Splice Bars	22.25
Plate Scrap, Punchings	21.25
Railroad Specialties	22.75
No. 1 Cast	20.00
R.R. Malleable	22.00

(Cast grades f.o.b. shipping point, railroad grades f.o.b. tracks)

BUFFALO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$19.25
No. 2 Heavy Melt. Steel	19.25
No. 1 Bundles	19.25
No. 2 Bundles	19.25
No. 1 Busheling	19.25
Machine Turnings	14.25
Short Shovel Turnings	16.25
Mixed Borings, Turn.	14.25
Cast Iron Borings	15.25
Low Phos.	21.75

DETROIT:

(Delivered consumer's plant)

Heavy Melting Steel	$17.32
No. 1 Busheling	17.32
Hydraulic Bundles	17.32
Flashings	17.32
Machine Turnings	12.32
Short Shovel, Turnings	14.32
Cast Iron Borings	13.32
Low Phos. Plate	19.82
No. 1 Cast	20.00
Heavy Breakable Cast	16.50

ST. LOUIS:

(Delivered consumer's plant)

Heavy Melting	17.50
No. 1 Locomotive Tires	20.00
Misc. Rails	19.00
Railroad Springs	22.00
Bundled Sheets	17.50
Axle Turnings	17.00
Machine Turnings	10.50
Shoveling Turnings	12.50
Rerolling Rails	21.00
Steel Car Axles	21.50-22.00
Steel Rails, 3 ft.	21.50
Steel Angle Bars	21.00
Cast Iron Wheels	20.00
No. 1 Machinery Cast	20.00
Railroad Malleable	22.00
Breakable Cast	16.50
Stove Plate	19.00
Grate Bars	15.25
Brake Shoes	15.25
(Cast grades f.o.b. shipping point)	
Stove Plate	18.00

CINCINNATI:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$18.50
No. 2 Heavy Melt. Steel	18.50
No. 1 Comp. Bundles	18.50
No. 2 Comp. Bundles	18.50
Machine Turnings	9.50-10.00
Shoveling Turnings	11.50-12.00
Cast Iron Borings	11.00-11.50
Mixed Borings, Turnings	10.50-11.00
No. 1 Cupola Cast	20.00
Breakable Cast	16.50
Low Phosphorus	21.00-21.50
Scrap Rails	20.50-21.00
Stove Plate	16.00-16.50

LOS ANGELES:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$14.00
No. 2 Heavy Melt. Steel	13.00
No. 1, 2 Deal. Bundles	12.00
Machine Turnings	4.50
Mixed Borings, Turnings	4.00
No. 1 Cast	20.00

SAN FRANCISCO:

(Delivered consumer's plant)

No. 1 Heavy Melt. Steel	$15.50
No. 2 Heavy Melt. Steel	14.50
No. 1 Busheling	15.50
No. 1, No. 2 Bundles	13.50
No. 3 Bundles	9.00
Machine Turnings	7.00
Billet, Forge Crops	15.50
Bar Crops, Plate	15.50
Cast Steel	15.50
Cut, Structural, Plate, 1", under	18.00
Alloy-free Turnings	7.00
Tin Can Bundles	14.50
No. 2 Steel Wheels	15.50
Iron, Steel Axles	23.00
No. 2 Cast Steel	15.50
Uncut Frogs, Switches	15.50
Scrap Rails	15.50
Locomotive Tires	15.50

NONFERROUS METAL PRICES

Copper: Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½c, refinery; dealers may add ¼c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more. 12.00c less than 20,000 lbs.

Brass Ingot: Carlot prices, including 25 cents per hundred freight allownace; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 13.00c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 15.75c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

Zinc: Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for larlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

Lead: Common 6.35c, chemical, 6.45c, corroding, 6.45, E. St. Louis for carloads; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York state, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester, Springfield, New Hampshire, Rhode Island.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less through 2000 lbs.

Secondary Aluminum: All grades 12.50c per lb. except as follows: Low grade piston alloy (No. 122 type) 10.50c; No. 12 foundry alloy (No. 2 grade) 10.50c; chemical warfare service ingot (92½% plus) 10.00c; steel deoxidizers in notch bars, granulated or shot, Grade 1 (95-97½%) 11.00c, Grade 2 (92-95%) 9.50c to 9.75c, Grade 3 (90-92%) 8.00c to 8.25c, Grade 4 (85-90%) 7.75c; any other ingot containing over 1% iron, except PM 754 and hardeners, 12.00c. Above prices for 30,000 lb. or more; add ¼c 10,000-30,000 lb.; °c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 2.50c lb., add 1c for special shapes and sizes. Allyo ingots, incendiary bomb alloy, 23.40c; 50-50 magnesium-aluminum, 23.75c; ASTM B93-41T, Nos. 2, 3, 4, 12, 13, 14, 17, 23.00c; Nos. 4X, 11, 13X, 17X, 25.00c; ASTM B-107-41T, or B-90-41T, No. 8X, 23.00c; No. 18, 23.50c; No. 18X, 25.00c. Selected magnesium crystals, crowns, and muffs, including all packing screening, barrelling, handling, and other preparation charges, 23.50c. Price for 100 lbs. or more; for 25-100 lbs., add 10c; for less than 25 lbs., 20c. Incendiary bomb alloy, f.o.b. plant, any quantity; carload freight allowed all other alloys for 500 lbs. or more.

Tin: Prices ex-dock, New York in 5-ton lots, Add 1 cent for 2240-11,199 lbs., 1½c 1000-2239. 2°c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05 per cent maximum arsenic, 51.87½c; Grade C, 99.65-99.79% incl. 51.62½c; Grade D, 99.50-99.64% incl., 51.50c; Grade E, 99-99.49% incl. 51.12½c; Grade F, below 99% (for tin content), 51.00c.

Antimony: American bulk carlots f.o.b. Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 14.50c; 99.8% and over (arsenic, 0.05%, max. and other impurities, 0.1%, max.) 15.00c. On producers' sales add ¼c for less than carload to 10,000 lb.; ½c for 9999-224 lb.; and 2c for 223 lb. and less; on sales by dealers, distributors and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

Mercury: Open market, spot, New York, $103-$106 per 76-lb. flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb.

Beryllium-Copper: 3.75-4.25% Be., $17 lb. contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

Cobalt: 97-99%, $1.50 lb., for 550 lb. (bbl.); $1.52 lb. for 100 lb. (case); $1.57 lb. under 100 lb.

Indium: 99.9%, $7.50 per troy ounce.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, N. Y. 70.625c per ounce.

Platinum: $35 per ounce.

Iridium: $165 per troy ounce.

Palladium: $24 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for Copper. Freight prepaid on 100 lbs. or more.

Sheet: Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A and B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

Rods: Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.48c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 26.50c.

Seamless Tubing: Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

Extruded Shapes: Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c; Muntz metal 20.12c; Naval brass 20.37c.

Angles and Channels: Yellow brass 27.98c; commercial bronze 90% 29.75c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

Copper Wire: Soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87°c; weatherproof, f.o.b. Eastern mills, carlot 17.00c, less-carlots 17.50c; magnet, delivered carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.25c, Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

Zinc Products: Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%; Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

Plating Materials

Chromic Acid: 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

Copper Anodes: Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

Copper Carbonate: 52-54% metallic cu, 250 lb. barrels 20.50c.

Copper Cyanide: 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

Sodium Cianide: 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

Nickel Anodes: 500-2999 lb. lots; cast and rolled carbonized 47.00c; rolled depolarized 48.00c.

Nickel Chloride: 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

Tin Anodes: 1000 lbs. and over 58.50c del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c. **Tin Crystals:** 400 lb. bbls. 39.00c f.o.b. Grasseli, N. J.; 100-lb. kegs 39.50c.

Sodium Stannate: 100 or 300-lb. drums 36.50c, del.; ton lots 35.50c.

Zinc Cyanide: 100-lb. kegs or bbls. 33.00c f.o.b. Niagara Falls.

Brass Mill Allowances: Prices for less than 15,000 lbs. f.o.b. shipping point. Add %c for 15,000-40,000 lbs.; 1c for 40,000 or more.

Scrap Metals

	Clean Heavy	Rod Ends	Clean Turnings
Copper	10.250	10.250	9.500
Tinned Copper	9.625	9.625	9.375
Yellow Brass	8.625	8.375	7.785
Commercial bronze			
90%	9.375	9.125	8.625
95%	9.500	9.250	8.750
Red Brass, 85%	9.125	8.875	8.375
Red Brass, 80%	9.125	8.875	8.375
Muntz Metal	8.000	7.750	7.250
Nickel Sil, 5%	9.250	9.000	4.625
Phos. br., A, B, 5%	11.000	10.750	9.750
Herculoy, Everdur or equivalent	10.250	10.000	9.250
Naval brass	8.250	8.000	7.500
Mang. bronze	8.250	8.000	7.500

Other than Brass Mill Scrap: Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add %c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbit-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 7.50c; Muntz metal condenser tubes 7.00c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

Aluminum Scrap: Price f.o.b. point of shipment, truckloads of 5000 pounds or over; Segregated solids, 2S, 3S, 5c lb., 11, 14, etc., 3 to 3.50c lb. All other high grade alloys 5c lb. Segregated borings and turnings, wrought alloys, 2, 2.50c lb. Other high-grade alloys 3.50, 4.00c lb. Mixed plant scrap, all solids, 2, 2.50c lb. borings and turnings one cent less than segregated.

Lead Scrap: Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

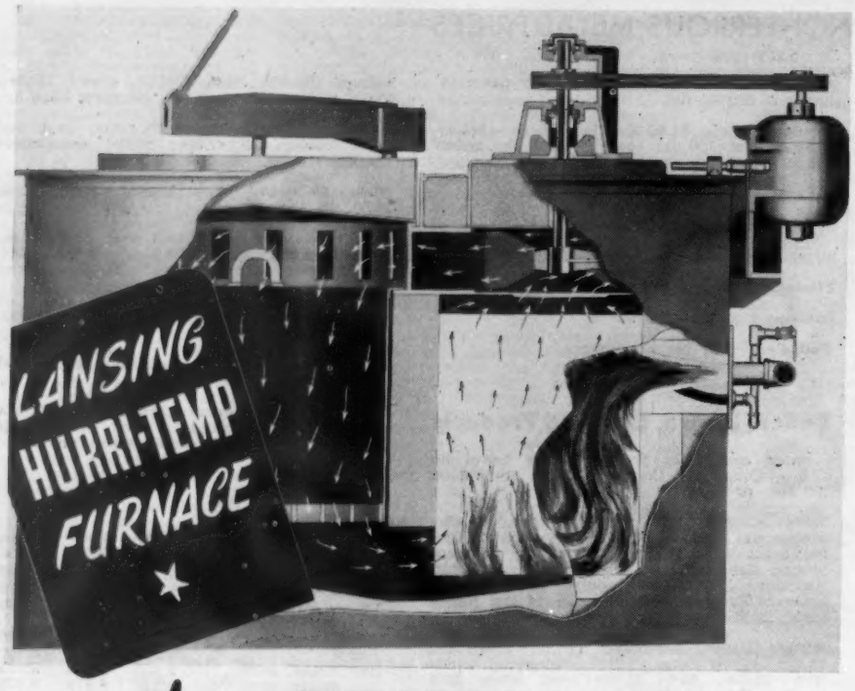
Zinc Scrap: New clippings 7.25c, old zinc 5.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c, add ½c 20,000 or more. Unsweated zinc dross; die cast slab 5.80c any quantity.

Nickel, Monel Scrap: Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

Nickel: 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

Cupro-nickel: 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

Monel: No. 1 castings, turnings 15.00c; new clipping 20.00c; soldered sheet 18.00c.



for SPEEDING UP TEMPERING OPERATION

INDUSTRIAL HEAT TREATING FURNACES

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NORMALIZING
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LANSING ENGINEERING COMPANY
934-36 Clark Street - LANSING 6, MICHIGAN

Sheets, Strip . . .

Sheet & Strip Prices, Page 148

Pressure for sheet delivery is being renewed, although several important consumers still are idle because of strikes. Most emphasis is on delivery of tonnage already on books, delayed by the strike, but there also is considerable buying, even in absence of delivery promise. Most sheetmakers are unable to make promises and in most instances little new tonnage in hot or cold-rolled can be expected to be delivered before fourth quarter.

New York—While various leading consumers are still tied up with strikes, especially certain electrical appliance manufacturers, there is considerable pressure for sheets now that producers generally are resuming operations. Most emphasis is on getting delivery of tonnage already on order with mills and held up by the recent strike. However, there is a flurry of new orders, with many consumers satisfied to get tonnage on mill books even without definite delivery promises.

Most producers are not yet in position where they can promise firm deliveries and in at least some instances it may take some time. However, most producers, with a few important exceptions, believe they will be producing at a reasonably good rate within two or three weeks and are predicating their tentative promises on this possibility. In general, it appears that little new tonnage in either hot or cold-rolled sheets is available before fourth quarter. In galvanized and certain specialties, such as silicon sheets and stainless steel sheets, shipments are not available much before the end of the year.

Producers, operating on a quota basis, and with tonnage confined to regular customers, are now setting up schedules for early second quarter. Some are forming schedules for May in view of the carryover resulting from the steel strike.

Cleveland—Sales offices of flat-rolled producers were deluged last week with inquiries regarding status of orders. The answer generally was to the effect that rolling schedules are unchanged from those prevailing just prior to the strike and that probable delivery dates will not be known definitely until about March 1. Mills lost an average of 60 days from the time of the fuel shortage until the end of the strike, indicating that tonnage originally scheduled for delivery this month will not be shipped until April; March in May; etc. Mills scheduled through second quarter when the strike started will not have open space until August and many will be filled through 1946. For this reason, producers generally are unable to accept revisions in specifications, even though a decrease in tonnage may be involved, unless the customer is willing to take a later delivery position. Many sellers are out of the market on narrow strip, galvanized sheets, electrical sheets and will withdraw on other products as soon as necessary adjustments are made. Some positions may open up in fourth quarter, however, if production can be raised above the prestrike level, or if there is any appreciable volume of cancellations. Producers who have been scheduling only one quarter in advance have opened second quarter books and are assigning smaller quotas to their district

offices than in the initial 1946 period. This is being done in order to eliminate first quarter carryover.

Pittsburgh — Output of sheets and strip got under way late last week. Where shearing operations only were necessary on sheets already rolled but not shipped when the steel strike started, deliveries were promptly made last week.

At the beginning of the steel strike producers had two to three weeks' carryover tonnage, while production lost just prior to the strike, during the shutdown period and time lag in resuming full operations account for at least eight weeks' output in most instances. Most producers have frozen production schedules as of date strike began and this policy is expected to remain in effect until full scale operations are resumed. What policy eventually will be followed in regard to the carryover tonnage has not been definitely decided.

CPA has urged producers to ration production to extent of serving only essential customers' needs and thereby ease as much as possible the critical short inventory situation at many plants. What will be done to build up badly depleted inventories of steel distributors is also undecided, except as in the case of other customer groups CPA has asked mills to schedule deliveries of standard items to warehouses to permit continuation of supply of production materials for small companies.

Nonintegrated mills state they cannot meet the wage demands and thus resume operations until full details productwise on the average $5 a ton increase in steel prices are published. Most interests expect that sheet bars and other semifinished items will not be advanced as much as finished items.

Philadelphia — Most leading sheet sellers regard themselves as virtually out of the market for the remainder of the year on hot and cold-rolled sheets, as well as galvanized, silicon and polished stainless. So critical has become the shortage in silicon sheets required for fractional horsepower motors and other electrical equipment that CPA has just granted priority assistance to enable producers to augment their facilities. Various sheet producers are scheduling on a quarterly quota basis and in some cases on a monthly quota basis, and technically are not committed far into the year, although practically they are, as they have given tacit assurance to regular customers that they will indefinitely take care of their requirements to the best of their ability. This means, however, that for some time at least they will not be able to give customers nearly all the tonnage they seek. In fact, quotas now being set up for second quarter reflect considerable paring down from fourth quarter of last year, the latest quarter of full production, because of the heavy carryover, which will result from the strike and delay in getting back to normal production.

Cincinnati — Sheet production in this district will soon be up to pre-strike normal, new contracts with the CIO being signed promptly at the Ashland, Ky., mill of The American Rolling Mill Co. Similar wage increases were granted employes of other units who remained at their jobs during conferences through independent unions as bargaining

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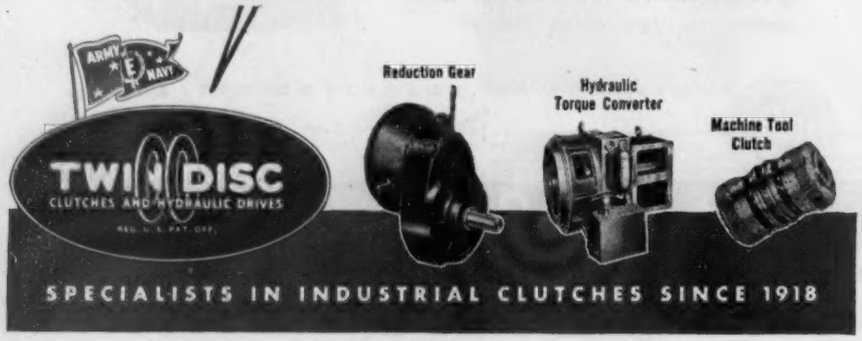


agents. Another district mill is still down. Rearranging of schedules is under way, made simpler because of continued high operations at some mills; for example Armco at Middletown produced 800 more tons of steel ingots in January than in any previous month.

Birmingham — Inquiries relative to deliveries of sheets and strip already are reaching local mills, and there is concern over delivery of commitments. Tennessee Coal, Iron & Railroad Co., at least, has made no recent commitments on virtually any specification, and will continue its own system of allocations, it is indicated, until pressure is eased.

Steel Bars . . .

Bar Prices, Page 148

Current bar buying can obtain little better delivery promise than late third quarter, with small sizes even later. Cold drawers are unable to quote definite deliveries because of uncertain mill deliveries of their raw material.

Philadelphia — Late third quarter delivery is indicated for medium and large bar sizes in hot carbon bars and fourth quarter for small sizes. Some producers have little, if any, small sized bar tonnage for shipment this year. Hot alloy bars, however, can be had for April.

Pittsburgh — Mills were swamped last week by inquiries as to delivery status of present commitments and a large volume of additional orders was booked. Sellers were unable to give any clear idea of delivery schedules except to state that shipments formerly promised for late January and February probably could not be completed until mid-April. Buyers of carbon bars not already on mill schedules, find it difficult to obtain even tentative delivery promises before late third quarter, with small sizes further extended. However, alloys can be obtained in second quarter. The month-long strike is expected to cause loss of nearly two months production for most mills. Sellers are making no effort to revise deliveries scheduled for shipment following the first 30 days after the strike, as the task of getting rolling schedules back to normal will be difficult enough, without further complications. Cold drawers are unable to quote definite delivery, which was extended into third quarter before the strike, because of uncertain mill deliveries.

Cleveland — Demand for bars continued active through the strike period and well in excess of what the industry can produce. Most sellers are out of the market on practically all sizes, although the true status of mill schedules cannot by determined before the first week in March. Some sellers are returning orders, especially for smaller sizes, since they are unwilling to accept 1947 business at this time. A portion of output will be channeled into the export market under various company programs as well as under the Office of International Trade's program. The Certified Export Order system is still in effect and OIT is expected to present revised demands on the Civilian Production Administration for steel exports during second and third quarters. A factor delaying return to normal is uncertainty regarding non-integrated steel producers' price position.

Chicago — The lone barmaker in this

district operating throughout the steel strike was able to improve his delivery position markedly by virtue of conditions not of his own making. Fact that General Motors plants had accepted shipments up to the limit of CPA directive and also the fact that the farm implement industry strike has cut off a consumer of a goodly proportion of his output, this mill has been able to accommodate a number of manufacturers needing bars and cut off from their normal source. Among plants aided have been several large forgers. On some sizes of bars, deliveries have been moved up to March and April by virtue of the peculiar situation.

Steel Plates . . .

Plate Prices, Page 149

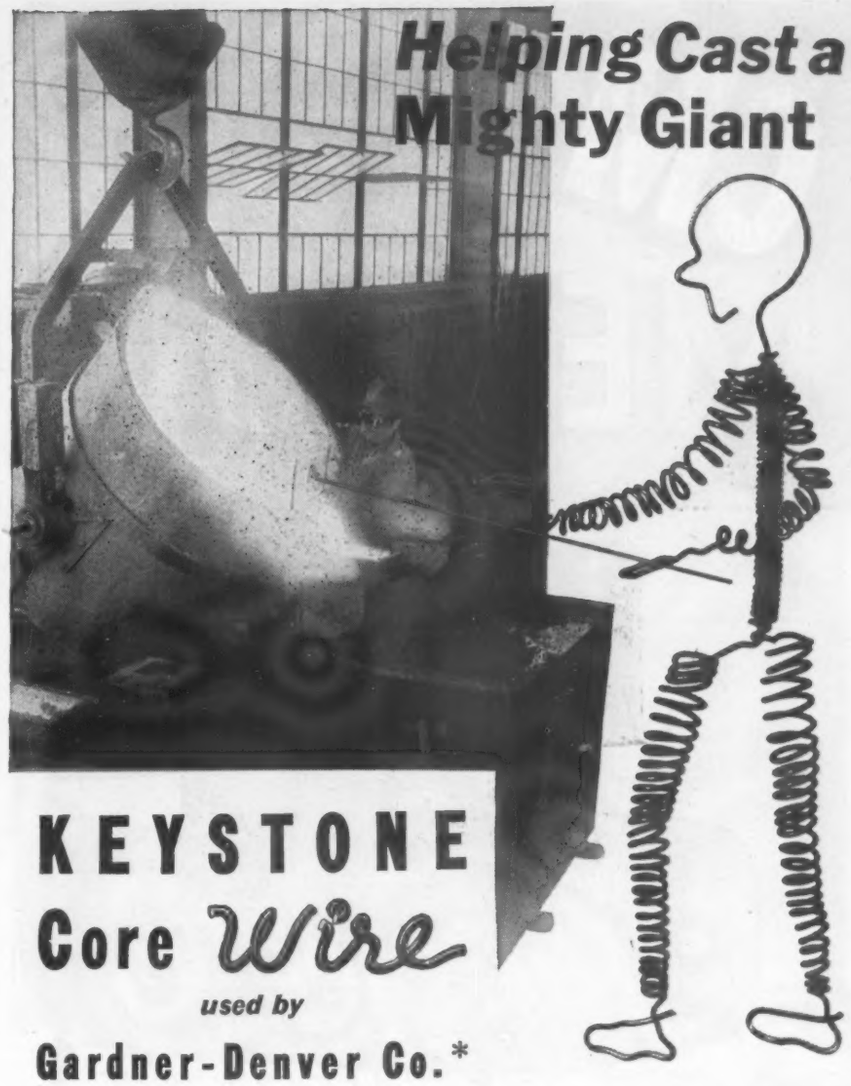
Plates may be booked for delivery late in third quarter, though some producers cannot do as well. Deliveries against old orders are being resumed in limited volume. Plate mills continued selling space on rolling schedules during the strike and have pushed delivery dates far ahead.

Philadelphia — Plates are available for late third quarter shipment, although some producers are promising nothing before October. Meanwhile, production is making a slow start following the strike. Two district mills, according to late reports, have not yet signed new labor contracts and other producers have been able to start up on only a limited basis. The current week, however, should see a substantial acceleration in production, with much depending on availability of raw materials, particularly pig iron.

Birmingham — Plate users find scant satisfaction in conditions locally as far as immediate requirements are concerned. Already from three weeks to six weeks behind, the strike has still further postponed deliveries, possibly to as much as five or six months.

Boston — Plate deliveries are being resumed in limited volume against old orders, with some revisions in pre-strike schedules. As most plate fabricating shops have been operating, inventories are low and out of balance; from these pressure for fill-in tonnage is heavier. Warehouses are also in this category. Plate mills have been selling potential space on rolling equipment steadily and much of the volume so taken in recent weeks is yet to be definitely specified and scheduled, generally in late third quarter. For car building, inquiry for high tensile low-alloy material is up. Demand for welding quality carbon plates is still centered in light gages. On the whole, the balance of January rolling schedules is going ahead first in production, but not without changes. In shipbuilding a mild bulge for fishing trawlers is in the offing; Bath Iron Works has 32 large units for the French and additional inquiry is pending for fishing interests. Trend is toward faster steel-hull boats to cut the time between the Banks grounds and landing ports.

Bids were postponed from Feb. 11 to March 11 by Maritime Commission, Washington, on four dry cargo ships, deadweight 24,000 tons each, 560 feet long, for the Ore Steamship Corp., New York. Ships are of the C5-S-AX1 type. Due, however, to firm bid clauses,



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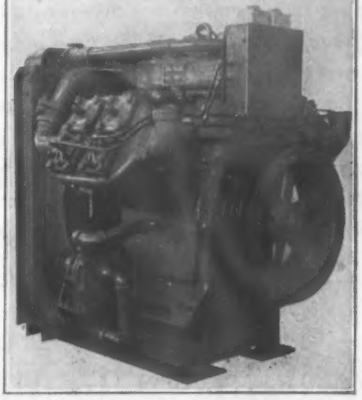

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coupled with high and uncertain material and labor costs, yards are reluctant to bid on this inquiry and other pending vessels up for March estimates by the commission, which in the aggregate take approximately 70,000 tons of steel, mainly plates.

Tubular Goods . . .

Tubular Goods Prices, Page 149

Cleveland—Most pipe sellers in this district are completely sold out for 1946 but they will not know definitely the status of orders on their books for another week. Some positions are still open on seamless tube and electric weld pipe mills but these are expected to disappear soon. Butt-weld and lap-weld pipe are especially tight. Mills are gradually being returned to normal operation but many may have to close again in about three weeks due to scarcity of skelp. Producers are from six to ten weeks behind schedule on shipments, due to the strike and, in addition, are still several weeks behind schedule as an aftermath of the fuel shortage last fall. Production and shipping schedules have been disrupted to such an extent that at least one producer is completely revising schedules. Jobbers' quotas for second quarter are being reduced in an attempt to lessen the heavy carryover.

Seattle—Cast iron pipe demand is strong but deliveries are slow and uncertain. Orders are being allocated and agencies cannot promise delivery dates. H. C. Purcell, Seattle, has booked 250 tons of 6 to 20-inch cast pipe for the Mason Ave. project at Tacoma. District 49, Seattle, has opened bids for 100 tons. Grand Coulee, Wash., will receive bids March 6 for a $95,307 project, including chlorinating plant, reservoir, 3000 feet of steel supply line and about 10,000 feet of 4 to 12-inch cast pipe and fittings.

Tin Plate . . .

Tin Plate Prices, Page 149

Pittsburgh — Tin plate output is expected to reach near pre-strike pace within 3 to 4 weeks. In some instances tin plate in freight cars was tied up at producers' plants when steel strike got under way and thus at least a small tonnage was available last week for immediate shipment. Mill warehouse tin plate stocks are another source for immediate shipment, although these stocks are below normal. Most finishing mills had a fair stock of slabs on hand at the termination of the steel strike, which permitted operations to get under way on a small scale once coke oven gas was available to operate reheating furnaces, etc. Because of this situation output of tin plate on a restricted basis is expected this week. Production of tin plate is expected to be under forced draft through the next 3 to 4 months for the scheduled food pack program. To meet this program CPA has directed producers to concentrate production of tin mill products suitable for use in making cans and closures, with special preference given to orders for products which will be used to make cans for packing perishable or seasonable food products. Sellers are uncertain as to when tin plate export directives, which totaled 215,500 tons, will be reinstated, and to what extent when they are. Weirton Steel Co. was the only company in

this area producing tin plate during the strike.

Rails, Cars . . .

Track Material Prices, Page 149

New York — Outstanding in the car market is the award of 1500 sixty-ton steel hoppers by the Wheeling & Lake Erie, divided equally between the American Car & Foundry Co., New York, with work to be done at Huntington, W. Va., and the Ralston Steel Car Co., Columbus, O. Little new is actually being figured at present, due in part, it is believed, to the fact that few cars can now be delivered before 1947, on the basis of the present outlook with regard to steel, lumber and other raw materials. Also contributing to the present lull is uncertainty with respect to costs, both with regard to labor and raw materials.

Birmingham — While stepping up its production schedule slightly, Pullman-Standard Car Mfg. Co.'s Bessemer, Ala., plant is still some weeks behind its delivery schedule. Illinois Central has placed an order here for 100 covered hoppers at a cost approximating $500,000.

Structural Shapes . . .

Structural Shape Prices, Page 149

Philadelphia — On the basis of present outlook shape deliveries fall principally in fourth quarter. Two leading producers have little to offer before October and another, not yet back in operation, is believed to be in about the same position. Only a greater diversion of steel to shape production than had been the case before the strike will materially alter this picture, it is said.

Boston — Substantial orders for plain structural material find mills filled on wanted smaller sizes through first half. Backlogs are out of balance as regards sizes and distribution, with indications slight relief will be forthcoming from the Buffalo district for some weeks, due to damage to primary equipment at Lackawanna. Warehouse inventories are depleted and with few exceptions, one Worcester shop included, fabricators are also low on plain material. Resumption of buying includes orders from both. Although fabricators have employed escalator clauses more for some time, those with firm contracts are confronted with losses because of higher steel and labor costs. Industrial inquiry for fabricated steel includes a new building for Sturtevant division, Westinghouse Electric Corp., Boston, but most buying is by Stone & Webster Engineering Corp. for work outside this district.

Pig Iron . . .

Pig Iron Prices, Page 151

Pig iron supply is being increased greatly, as time is required for getting blast furnaces into normal operation after being idle. Meanwhile, demand is heavy as supply was short when the steel strike started and much of that on hand then has been used during the strike. Shortage is expected to continue through most, if not all, of the year. Heavy ordering is expected for some time, with little prospect of larger deliveries.

Pittsburgh — Pig iron shortage is expected to remain acute over the next 2

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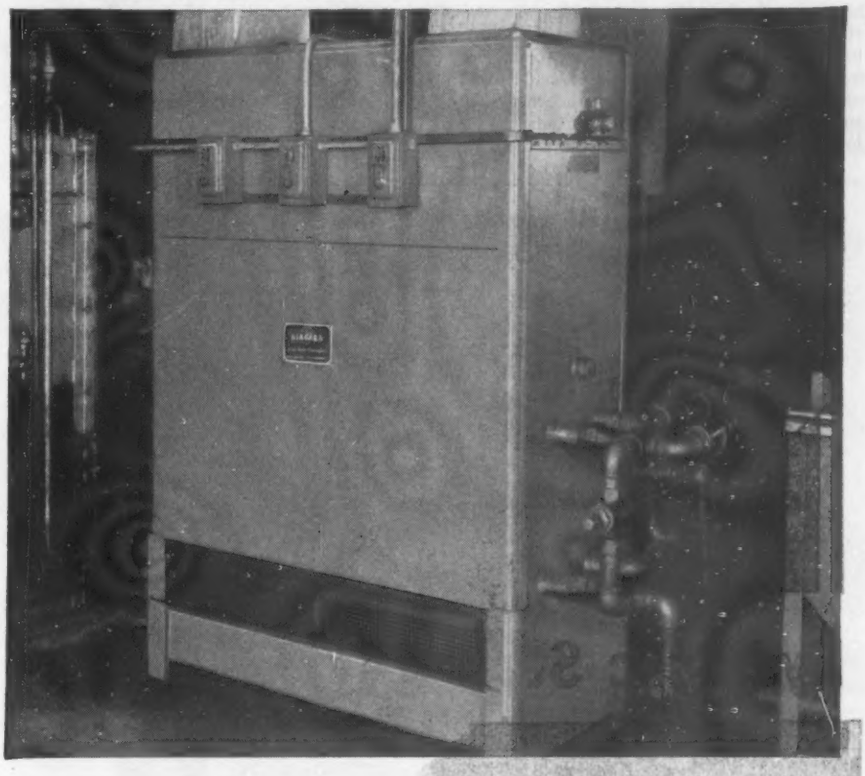

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to 3 weeks, due to delay necessary in getting blast furnace units up to normal production. Prior to the strike, pig iron was in short supply, with merchant producers forced to ration tonnage and little improvement is indicated in future. Some interests predict a shortage through the year. Producers' stocks are low and accentuating this condition are the depleted inventories reported among many foundries and the general shortage of cast scrap. Some foundries started to taper production two weeks before the strike terminated, to conserve inventories, but even in these instances pig iron inventories are low and badly out of balance. Further complicating the supply situation is the report that the lone merchant stack here will not be pouring iron until about March 1. Sellers expect a huge volume of new orders over the next 30 days, as consumers attempt to build stocks to normal levels. No merchant stacks were active in this district through the strike.

It is believed that the first pig iron tapped at any struck mill was poured from a blast furnace at the National Tube Co.'s National Works at McKeesport, Monday night, Feb. 18. The early taps of pig iron are too high in silicon to make steel.

Additional upward adjustment in pig iron prices is being pressed by blast furnace interests, but no action on this matter is in immediate prospect. Some foundries in Detroit and Buffalo areas have refused to reopen until price relief is granted. Hearings in Washington on subject of castings prices are scheduled for early March.

New York—Pig iron producers are slowly getting back into production now that the steel strike is generally over. Most producers serving this area believe they will be back to normal production by early this week. Meanwhile, consumers are pressing hard for tonnage and in various instances are being held up in making a return to normal production by shortage of pig iron. Several foundries which went down in this district as a result of a walkout in their own plants by CIO labor, have started again but are cautiously doing so until the outlook for a steadier supply of raw material becomes clear.

Cincinnati — Pig iron inventories of district foundries are virtually exhausted. Only in isolated cases, however, have shipments failed to the extent that shutdowns were forced. Inquiries to other than regular sources of iron indicate the tightness of supply, and often replies to such inquiries are discouraging. Effects, directly and indirectly, of strikes are holding the melt below levels of recent months.

Buffalo—Consumers are pressing merchant iron producers for speedy shipments. There are instances, however, where sellers must regain consumers who placed orders during the strike with a producer who was not hit by labor trouble. The price problem is also bothering producers. Michigan auto casters are among those seeking stock. Other consumers who operated during the nationwide labor walkout report inventories practically used up and present operations on a hand-to-mouth basis. Pig iron output here has reached 47 per cent of capacity. The rate is expected to hover around this level for several weeks while Bethlehem's Lackawanna mill cleans out five units left untended by an advanced walkout of workers Jan. 11.

Chicago — Numerous foundries are on the verge of shutdown unless they are able to get iron and coke promptly. In several instances, closings were averted through directives for iron against the few blast furnaces in the district operating during the steel strike. It will be several days, however, before iron will start flowing anywhere near normal, for blast furnaces are resuming slowly as coke supply permits. As of late last week, something over 20 of the district's 41 blast furnaces were active, this comparing with nine during the four weeks of the strike, and 28 in the week preceding it. Meanwhile, foundry scrap has been short and foundries were not able to get enough to offset iron shortage.

Philadelphia — Pig iron consumers are pressing hard for basic but pressure for foundry iron is less than trade leaders had expected. Some foundries seek all the iron they can get but others appear to have fair inventories. The fact that one district blast furnace, which usually devotes much of its output to other grades, was able through the strike to keep operating on foundry iron helped the situation in this district materially, with some shipments which continued to come from two producers in the Buffalo district and from two in the South. However, this local district producer plans to switch to basic and as it re-

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quires time for other stacks to resume production the overall situation is tight.

Birmingham — Pig iron production, while steady with merchant melters, seems to be moving into a somewhat more marked shortage. Foundries are running on close margins and the wide diversity of needs remains slightly ahead of comfortable supply. Furnace interests are insisting upon contract buying where possible, and some irregular users are having difficulty covering their needs.

Scrap . . .

Scrap Prices, Page 152

Resumption of steelmaking has not increased demand for scrap as time is required to get under way fully. Melters had made provision for supply by various storage plans and now have more reserves than before the strike. However, all offerings of steelmaking grades are being accepted. Brokers find it difficult to find sufficient material to fill orders, as many producers have been idle also. Railroad offerings are light.

Pittsburgh — Scrap shipments showed only slight improvement last week despite resumption of open-hearth and blast furnace operations after the strike. Most steel producers had attempted to build scrap inventories at storage depots and in dealers' yards, with the result that mill supply is somewhat larger. However, most consumers accept all good quality carbon scrap offered, as reserves still are well below normal. Scrap consumption is not likely to reach prestrike level for another two weeks, because of lag in getting steel production back to normal.

Brokers and dealers are hard pressed to find tonnage to fill current orders. Production scrap supply has been low recently, reflecting complete shutdown of many metalworking plants, strikes in automotive and major electrical equipment plants and tapering of metal fabricating operations from lack of steel. Available railroad scrap also has been below normal, illustrated by the current Pennsylvania railroad list, which did not include any heavy melting steel. Cast scrap supply has been inadequate to meet heavy foundry demand to make up for lack of pig iron. Higer scrap prices are not likely, according to trade leaders. Advance in steel prices probably will result in added pressure for higher prices for scrap from metalworking plants but the general opinion is that the present spread of $3.50 per ton for preparation will continue.

Cleveland—Dealers are seeking scrap supplies from all sources and better tonnage is coming out, some producers letting go of accumulations more freely. Blast furnace and open-hearth grades are moving freely to the full extent of offerings but low phos is not in demand. Further buying is expected after March 1 but accumulation of cars on tracks waiting to be unloaded confuses the situation and prevents buying at present.

Buffalo—Leading mill consumers are again taking scrap shipments despite accumulation of thousands of tons in their yards during the strike. Strong tendencies prevail as dealers report new sales and the refusal of additional orders because of a tight supply. Dealers' yard stocks continue to shrink as consumers push for scrap and receipts remain low because of industrial tieups which have kept production material at a minimum. Big dealers who make scrap pickups from plants report their trucks are virtually at a standstill. Concern over future supplies hinges on the fact that mills are getting back into action but most industrial plants continue idle.

Washington—OPA last week changed its regulation governing sale of iron and steel scrap, to provide that it will be illegal for a purchaser of scrap to act both as dealer and broker in the same transaction if the combination results in a price in excess of the established ceiling prices. The action is effective Feb. 25.

Chicago — Ten days ago, just before the steel strike ended, two mills in the district suspended scrap shipments, because storage space at docks and outside-plant yards was exhausted. Shipments have been reinstated, however, now that the strike is over and material can go direct to yards. During the mill shutdown, scrap buying continued at strong level and ceiling prices obtained. All mills had enough scrap on hand to resume melting on the small scale planned for the first week or two. From this point on, they will augment direct shipments with material picked as required from storage points. With the rise in steel wages, scrap operators figure they will be pressed for higher wages, and this in turn would necessitate higher prices for scrap.

Philadelphia — In line with general expectations scrap demand has under-

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gone sharp increase, especially in steelmaking grades. There still are a few consumers not yet back into production and are holding back shipments. However, pressure from other sources has increased, with interest from plants well inland. One leading consumer in the district has resumed shipments at all points. While steel prices are definitely slated for an increase ceiling prices on scrap are likely to show no change in the near future, according to leading trade opinion.

Cincinnati — Ending of the steel strikes had no immediate reflection in the iron and steel scrap market. Demand has been strong and steady, the strike appearing most prominently in a reduction of tonnage offered to dealers and brokers. District melters resuming operations are fairly well fixed with scrap. One nearby interest will take in tonnage on which shipment was suspended, before making new purchases. Foundries, pinched for pig iron, are eager for good cast.

Birmingham — Scrap continues in heavy demand and at ceiling prices. While steel mills have not held up shipments, railroads have not yet lifted their embargo and will not, it is indicated, until loaded cars are unloaded and returned. Repubic is reported to have nearly 150 cars at Gadsden to be unloaded. Weather continues to interfere with preparation of scrap.

St. Louis—Scrap is moving briskly, struck mills having arranged to stockpile tonnage off the premises. One melter placed an order last week for 300 cars to be stockpiled as received. Shipments are slow to fair. Some brokers complain producers are holding back tonnage for prospective higher prices, using labor shortage as an excuse. Through the strike there has been ready market for all available scrap and prices have been strong. Most foundries have built adequate reserves

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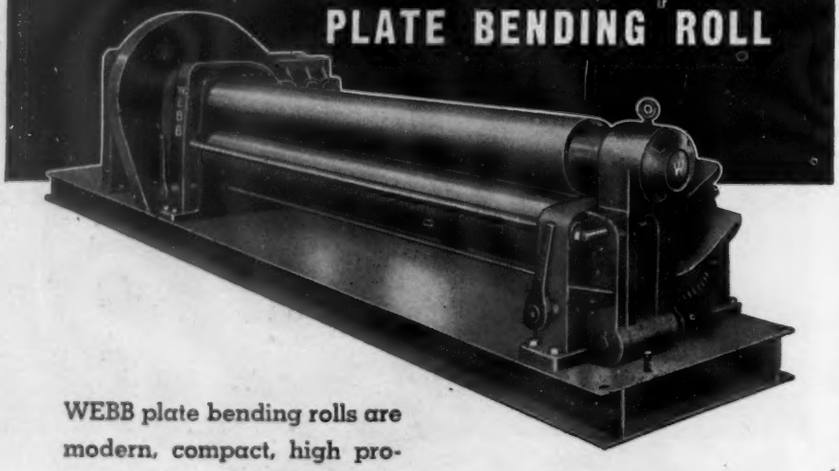

WEBB plate bending rolls are modern, compact, high production machines. Made in a complete range of sizes and capacities, these rolls are being used on high quantity production rolling in all types of metal shops throughout the United States. These rolls are made in both pyramid and pinch types.

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PROMPT DELIVERY ON STANDARD SIZES

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MANUFACTURERS

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High Ocean Rates Limit Foreign Ore Shipments

New York — While there has been some easing in ocean rates since the end of the war, possibly as much as 20 per cent, they are still much too high to permit any general movement of foreign iron ore into this country. Consequently, all leading grades of foreign iron ore, such as North African low phosphorus, Swedish basic and Spanish and North African basic, are purely nominal. Only small scattered lots, brought over primarily as ballast, are reported here and not in sufficient quantity to establish a market.

Shipments of manganese ore are being received by consumers at 10 cents per unit under the Metals Reserve Co. prices, and even less, it is reported, in some cases. This ore is coming in principally from the Gold Coast, South Africa and India. Manganese ore continues to come in from Russia, although in this case solely for the account of Metals Reserve Co. Selling prices of Metals Reserve Co. ore remain at 85 cents per gross ton unit, dry, 48 per cent, New York, Philadelphia, Baltimore, Norfolk, Mobile and New Orleans.

Chrome ore prices in general are unchanged, barring a few revisions. Indian and African chrome, 48 per cent, 2.8:1 is now quoted at $39.85, against $41, and 48 per cent, 3:1, $41, against $43.50. Rhodesian, 48 per cent, 3:1, also is down to $41, as compared with $43.50 previously.

No shipments as yet have been received from the Philippines. The mines there are not in too bad shape; however, the main difficulty is lack of adequate transportation from mines to ports and too high ocean rates.

Warehouse . . .

Warehouse Prices, Page 150

Pittsburgh — Steel distributors probably will ration their nearly depleted inventories for at least 30 days, to regular customers and for emergency repairs and other critical purposes. Most warehouses here were under USA-CIO contracts and thus closed. Because of this, distributor stocks perhaps are better than in some other districts. Distributors do not expect to be given preference in mill shipments during the next 30 days, although inventories are inadequate to meet heavy inquiries.

In this connection Civilian Production Administration, in a declaration of policy designed to provide for minimum needs of the greatest number of steel users, states that all producers shall schedule shipments to warehouses so that they may make deliveries of standard items to permit continuation of supply of production materials for small

business, maintenance and repair. With mill deliveries unlikely to reach prestrike level for three to four weeks the current heavy volume of inquiries probably will be maintained. A trickle of steel continues from the surplus war steel stock pool but this is inadequate in tonnage and in most instances is not of desired specifications. Efforts of War Assets Corp. to put on the market an estimated 1.7 million tons of Army and Navy surplus steel has not yet brought significant results.

Cleveland — A terrific squeeze was exerted on steel warehouses last week when they shipped material on the old price basis when mill shipment will be billed at the advanced price. Uncertainty regarding prices prevented independent warehouses which were strike bound from concluding union agreements. The position of warehouses has been imperiled further by the loss of about eight weeks' supply. While mills have shipped some material that was fully or almost fully processed when the strike was called, the flow is not expected to approach a normal rate for at least three weeks. Stocks have been unbalanced still further, with most warehouses entirely out of some items. Structurals, hot-rolled sheet, plates, bar-sized angles, small rounds and narrow strip are in tightest supply. If warehouses had the material, they could increase their volume four or five times.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1980 tons, bridge A-313, Canyon Diablo, Ariz., for Atchison, Topeka & Santa Fe railroad, to Kansas City Bridge Co., Kansas City. Mo.; bids Feb. 12.

1520 tons, beam and DPG spans for line change, between Ainsworth and Brighton, Iowa, for Chicago, Rock Island & Pacific railroad, to American Bridge Co., Pittsburgh; bids Feb. 16.

1500 tons, structural fabricating shop and runway, Milwaukee, for Chicago, Milwaukee, St. Paul & Pacific railroad, to American Bridge Co., Pittsburgh; Siesel Construction Co., Milwaukee, contractor; bids Jan. 28.

900 tons, office building, Hartford Fire Insurance Co., Hartford, Conn., to Standard Structural Steel Co., Hartford, through Wadhems & May, Hartford.

900 tons, tobacco warehouse for P. Lorillard, Lexington, Ky., to Bethlehem Steel Co., Bethlehem, Pa., through United Engineers & Constructors Inc., Philadelphia.

660 tons, bridge No. 6.35, Richmond, Ind., for Chesapeake & Ohio railroad, to American Bridge Co., Pittsburgh.

500 tons, factory, Montgomery, Ill., for United Wallpaper Inc., to American Bridge Co., Pittsburgh.

465 tons, plant addition at Middlesex, N. J., to Belmont Iron Works, Philadelphia, through Turner Construction Co., Philadelphia.

390 tons, department store, San Antonio, Tex., for Neisner Bros., to American Bridge Co., Pittsburgh.

374 tons, delivery building, Minneapolis, for Dayton, O., to American Bridge Co., Pittsburgh.

350 tons, factory building, Mankato, Minn., for Archer-Daniels-Midland Co., to Hansell-Elcock Co., Chicago.

300 tons, addition to state office building, Buffalo; plans state architect's office, Albany, N. Y.

290 tons, spans, Rule, Tex., for State Highway Commission, to Austin Bros., Dallas, Tex.

250 tons, factory building, Madison, Wis., for Forsberg Paper Box Co., to Milwaukee

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Bridge Co., Milwaukee.

240 tons, three-story addition, Bryant Electric Co., Bridgeport, Conn., to Lehigh Structural Steel Co., Allentown, Pa.; Gallately Construction Co., Bridgeport, general contractor; Fireproof Products Co. awarded 40 tons of reinforcing bars.

210 tons, building, State Teachers' college, Willimantic, Conn., to Electric Boat Co., Groton, Conn.

206 tons, West 47th street underpass, Chicago, for Cook county, to American Bridge Co., Pittsburgh; bids Jan. 21.

112 tons, 123rd street viaduct, Chicago, for Cook county, to American Bridge Co., Pittsburgh; bids Jan. 21.

110 tons, Pennsylvania Railroad bridge, Washington, to American Bridge Co., Pittsburgh.

Unstated, $900,000 addition to Millard Fillmore Hospital, Buffalo; F. J. & W. A. Kidd, architects, Buffalo.

STRUCTURAL STEEL PENDING

4000 tons, section of Brooklyn-Battery tunnel; Grow Construction Co., low.

2500 tons, state highway bridges; bids March 27, at Albany.

2010 tons, superstructure, Pennsylvania railroad bridge, Tuscarawas river, local protection project, Massillon, O.; bids postponed from Feb. 12 to 27, U. S. engineer office, Huntington, W. Va.

2000 tons, theater at Lareforma, Mexico; John & Drew Eberson, 2 West 47th St., New York, taking bids.

900 tons, state road work near Elizabeth, N. J.; Charles H. Vachras, Brooklyn, general contractor, is low.

800 tons, cafeteria and auditorium for the Navy, at White Oaks, Md.

600 tons, plant addition, Allen Industries, Rahway, N. J.; Walter Kidde, New York, is engineer.

570 tons, DPG span, bridge No. 919, Eau Claire, Wis., for State Highway Commission; bids Feb. 14.

560 tons, Allatoona dam, Etowah river, near Cartersville, Ga., also 342 tons trash rack steel and 710 tons steel penstocks; bids about April 2 to U. S. engineer, Mobile, Ala.

550 tons shapes and 585 tons interlining for Merriman Dam, Ulster county, New York; bids Feb. 27 through Board of Water Supply, New York City.

500 tons, Harkness pavilion, New York Medical Center; Vermilya-Brown, engineer.

500 tons, plant addition for Salone Co., Norwalk, Conn.; bids Feb. 27.

400 tons, permanent tunnel supports, Rams Horn and Prospect Mountain tunnels, Colorado; bids Feb. 26 to Bureau of Reclamation, Denver.

400 tons, state highway bridge in Northumberland county, Pennsylvania.

300 tons, fixed wheel gate frames, Davis Dam, Louise, Ariz., for Bureau of Reclamation.

290 tons, Western Electric Co., office building, Allentown, Pa.

250 tons, railroad overpass, King county, Washington; bids to Olympia, Feb. 26.

225 tons, including 70 tons galvanized for switchyard structure, completion, power house, Dale Hollow dam, Obey river, Clay county, Tennessee; bids March 19 to U. S. engineer, Nashville.

225 tons, manufacturing building No. 10, Kankakee, Ill., for American Marietta Co.

150 tons, plant addition for Reyburn Mfg. Co., Philadelphia.

Unstated, three bridges for Skagit Railroad, Seattle; bids soon.

REINFORCING BARS . . .

REINFORCED BARS PLACED

250 tons, substructure new plant, Milwaukee, for Blatz Brewing Co., to Joseph T. Ryerson & Son Inc., Chicago; Thompson-Starrett Co., contractor.

100 tons, mill building, Strong, Hewat & Co., Briggsville, Mass., to Concrete Steel Co., Boston; Aberthaw Construction Co., Boston, general contractor.

REINFORCED BARS PENDING

2700 tons, Allatoona dam, Etowah river, near Cartersville, Ga.; bids about April 2 to U. S. engineer, Mobile, Ala.

2100 tons, new plant, Chicago, for R. R. Donnelley & Sons.

1050 tons, bridge substructure and tunnel, relocation Conemaugh division, Pennsylvania railroad; bids March 18 to U. S. engineer, Pittsburgh.

300 tons, three state concrete spans, Cowlitz County, Washington; McRae Bros., Seattle, low, $207,231.

500 tons, completion of power house, Dale Hollow dam, Obey river, Clay county, Tennessee; bids March 19 to U. S. engineer, Nashville.

350 tons, Harms road sewer, Glenview and Morton Grove, Ill., for Chicago, Sanitary District; Santucci Construction Co., Skokie, Ill., low; bids Feb. 14.

250 tons, dam, Ompompanoosuc river, Union village, Vt.; bids March 28 to U. S. engineer, Providence, R. I.

165 tons, overpass King County, Washington; bids to Olympia, Feb. 26.

150 tons, miscellaneous repairs, Chicago, for Department of Public Works; no bids received to invitation closing Nov. 30, now asking new bids Feb. 27.

130 tons, state span Wenatchee river, Wash.; bids to Olympia, Feb. 26.

PLATES . . .

PLATES PLACED

Unstated, elevated steel water tank for Yelm, Wash., to Chicago Bridge & Iron Co., Chicago.

PLATES PENDING

Unstated, 186-foot steel tug, for Port of Portland Commission, Portland, Oreg.; bids soon.

Unstated, 3000 feet 10-inch water pipe for Grand Coulee, Wash.; bids March 6.

PIPE . . .

CAST IRON PIPE PLACED

250 tons, 20 to 6-inch cast iron pipe for Mason avenue project, Tacoma, to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

CAST IRON PIPE PENDING

100 tons or more, District 49, Seattle; bids in.
100 tons or more, No. 79th St., Seattle; bids in.

RAILS, CARS . . .

RAILROAD CARS PLACED

Wheeling & Lake Erie, 1500 sixty-ton steel hopper cars, divided equally between American Car & Foundry Co., New York, and Ralston Steel Car Co., Columbus, O.

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Henry Ford II Replies to Criticism by Bowles

(*Continued from Page 57*)

ceilings on most finished parts for new automobiles were removed last fall. But the statement of Mr. Bowles in this respect does not reflect all the facts. He does not make it clear that manufacturers who supply our suppliers with parts do have price ceilings. He also ignores the

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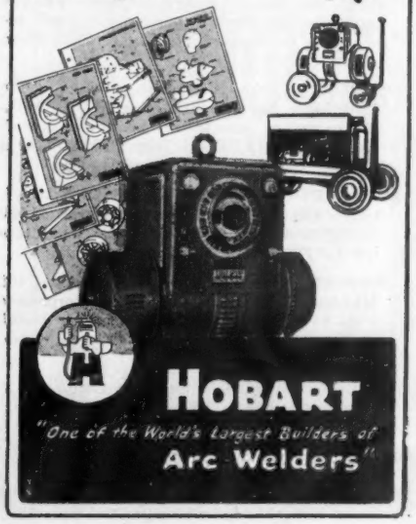

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fact that parts for trucks and all automotive replacement parts, as well as tires, batteries, radios, ferrous and nonferrous castings, are still subject to ceiling prices.

"In making public our estimates of last summer that motor cars would cost 55 per cent more to make during the first postwar year than in 1941, Mr. Bowles failed to make it clear that these estimates were submitted to OPA before OPA had announced any price regulation on new cars—more than a month before OPA had given us even the basis on which price ceilings were to be calculated.

"What Mr. Bowles had to say on this point and the manner in which he chose to say it left the impression that we had secretly applied for a 55 per cent increase in existing price ceilings. Actually, we have applied for no price relief on any of our cars.

"Incidentally, these estimates of last July turned out to be pretty accurate. We estimated, for example, that our most popular model, which had cost $512 to make in 1941 would cost us, under postwar conditions, about $935. We found in November, before we reached scheduled production, that it was costing us $963 to make this model. Since then we have cut that cost somewhat by increased production efficiency, but in the meantime we have added about $41 million to our annual wage bill, and still have to absorb increased costs to us and our suppliers due to the steel price increase.

"I have stated publicly my opinion that inflation is based on scarcity and that the way to prevent inflationary prices of manufactured products is to produce goods for people to buy with the money they have to spend. We at Ford are going to continue to act in that belief."

President Truman's Order On Prices and Wages

(*Continued from Page 57*)

of cases if it finds that such action is necessary to effectuate the purposes of this order.

(b) The Stabilization Administrator may, by regulation, specify classes of wage or salary increases which will in his judgment, have no unstabilizing consequences and which may be deemed approved within the meaning of this order without prior consideration by the wage or salary stabilization agencies. Such regulations may make special provision for cases, among others, in which (1) the increase is to be of limited amount, or (2) a small number of employees will be involved, or (3) there will be in all probability no substantial effect upon price or rent ceilings or costs to the United States.

(c) Except as the Stabilization Ad-

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ministrator may by regulation otherwise provide, the making, after the effective date of this order, of any wage or salary increase pursuant to Part IV, section 1, of Executive Order 9599, without the prior approval of the National Wage Stabilization Board or other designated wage or salary stabilization agency having jurisdiction with respect to the wages or salaries involved, shall constitute a waiver of any right of the employer to use such increase, at any time during the continuation of the stabilization laws, as a basis for seeking an increase in price or rent ceilings or, in the case of products or services being furnished under contract with a Federal procurement agency, as a basis for increasing costs to the United States. The Stabilization Administrator shall have authority to provide by regulation that wage or salary increases of a particular class shall be unlawful unless made with the prior approval of the Board or other designated agency, if in his judgment such action is necessary to prevent wage or salary increases inconsistent with the purposes of the stabilization laws.

(d) In accordance with and subject to the provisions of section 2 of this order, any wage or salary increase heretofore lawfully made, or made in accordance with a governmental recommendation in a wage controversy announced prior to the effective date of this order, shall be deemed to have been approved within the meaning of this order, and may be taken into account as a basis for increasing price or rent ceilings or, in the case of products or services being furnished under contract with a Federal procurement agency, as a basis for increasing costs to the United States.

(e) All arbitration awards, and all recommendations of publicly-appointed fact-finding panels, with respect to wage or salary issues shall conform with the standards of this order and the regulations and directives issued thereunder. No wage or salary increases shall be put into effect in accordance with any such awards or recommendations, hereafter announced, unless and until approved by the appropriate wage or salary stabilization agency, or unless such awards or recommendations are voluntarily accepted by the parties on the basis stated in the first sentence of subsection (c) of this section.

4. The Stabilization Administrator, in the Office of War Mobilization and Reconversion, shall have full authority to issue such orders and directives as may be necessary, in his judgment, to carry out the purposes of this order.

5. Any provision of any prior Executive Order in conflict herewith is hereby superseded to the extent of such conflict.

6. This order shall become effective Feb. 14, 1946.

(Sgd) HARRY S. TRUMAN

THE WHITE HOUSE
Feb. 14, 1946.

CONSTRUCTION AND ENTERPRISE

MICHIGAN

ALMA, MICH.—Alma Piston Co., 925 Superior St., has been incorporated with $250,000 capital to manufacture automobile and airplane parts, by Emmett E. Tracey, same address.

BATTLE CREEK, MICH.—Battle Creek Plating Corp., 137 West Van Buren St., has been incorporated with $100,000 capital to do general plating, by M. L. Michner, 2124 Spring Arbor Rd., Jackson, Mich.

CHARLEVOIX, MICH.—Gar Wood Jr., Specialties Inc., Cherry St., has been incorporated with $100,000 capital to manufacture motors machinery and appliances, by Gar Wood Jr. same address.

CLAWSON, MICH.—Grand Steel Mfg. Co., 71 West Clawson Ave., has been incorporated with $30,000 capital to manufacture metal products, by Ella Vineberg, 3266 Webb Ave., Detroit.

DEARBORN, MICH.—Haggerty Tool & Die Corp., 10501 Haggerty Ave., has been incorporated with $50,000 capital to manufacture tools, dies, jigs, fixtures and gages, by Irving Hinkel, 6535 Hartwell Ave.

DETROIT—Ajax Mfg. Co. Inc., Book-Cadillac Hotel, is having plans prepared for a manufacturing plant to cost about $150,000.

DETROIT—J. & F. Wheel Alignment Mfg. Co., 15311 Wisconsin Ave., has been incorporated with $30,000 capital to manufacture wheel alignment devices, by Arthur J. Jans, same address.

DETROIT—American Tubing Co., 2850 Penobscot Bldg., has been incorporated with $50,000 to manufacture copper, brass and metal tubing, by E. van Benachschoten, same address.

DETROIT—Garland Mfg. Co., 10533 Gratiot Ave., has been incorporated with $250,000 capital to manufacture stampings, by Herman Otto, 14287 Evanston Ave.

DETROIT—Leath Motor Co., 849 Penobscot Bldg., has been incorporated with $40,000 capital to manufacture motors, parts and accessories, by Rolland M. Berg, 24735 Evergreen Ave.

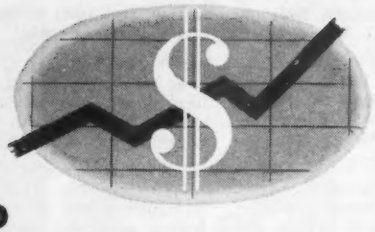
DETROIT — Norgas Distributors Inc., 1354 Book Bldg., has been incorporated with $20,000 capital to manufacture heating and cooling units, by T. Earle Trese, 19344 Griggs Ave.

DETROIT—Crescent Steel Co., 6615 East Jefferson Ave., has been incorporated with $1000 capital to do general manufacturing, by Stanley L. Fildew, 3156 Penobscot Bldg.

DETROIT—New Era Steel Tile Corp., 401 Michigan Bank Bldg., has been incorporated with $40,000 capital to manufacture metal, steel and plastic products, by Max G. Cushman, 9316 Oakland Ave.

DETROIT—Simplex Motor Parts Corp., 10413 Mack Ave., has been incorporated with $50,000 capital to manufacture pistons, piston rings and pins, by William A. Dubay, 3437 Fairview Ave.

DETROIT—Barrett Mfg. Corp., 19036 Van Dyke Ave., has been incorporated with $50,-



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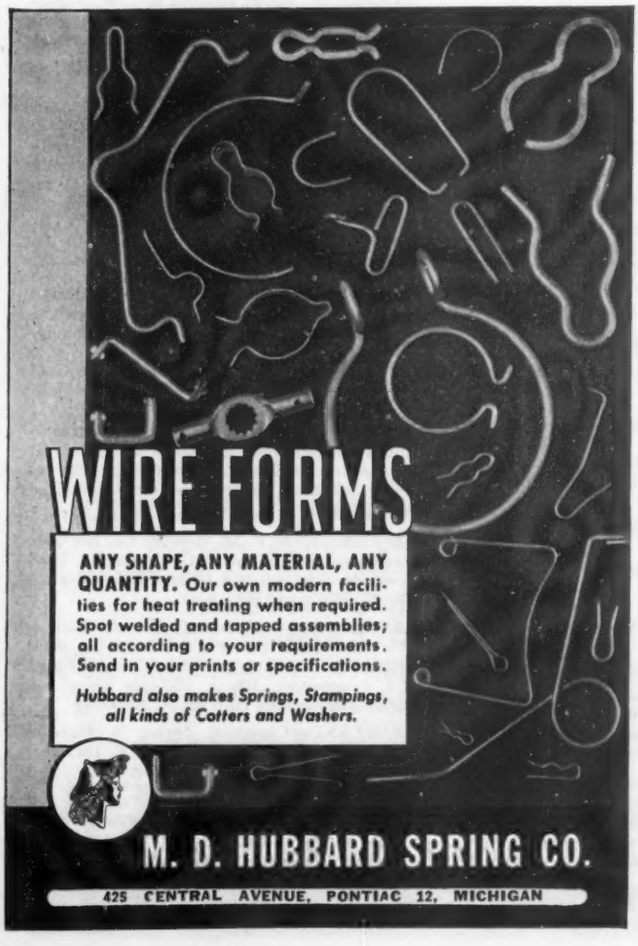

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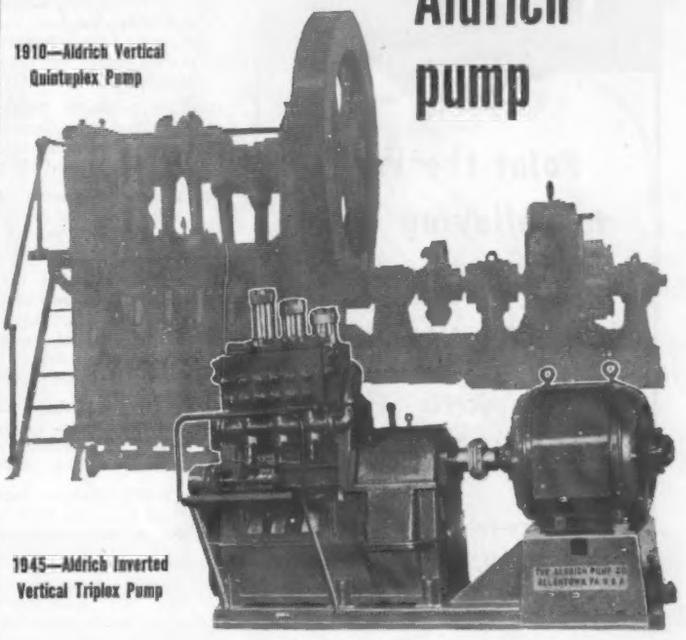

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000 capital to manufacture machinery, tools and dies by M. A. Barrett, 247 Kenwood, Grosse Pointe, Mich.

DETROIT—Mardigian Corp., 1150 West Grand Blvd., has been incorporated with $500,000 capital to operate a general tool and die shop, by Edward Mardigian, same address.

DETROIT—Mercury Tool & Die Co. Inc., 7339 West Eight Mile Rd., has been incorporated with $125,000 capital to manufacture tools, dies, jigs and machinery, by George Fischer, 825 Whitmore Rd.

DETROIT—Spirek Broach Corp., 2746 Penobscot Bldg., has been incorporated with $1000 capital to manufacture broaches and other cutting tools, by Paul R. Trigg, Jr., same address.

DETROIT—Major Mfg. Co., 300 Whitmore Rd., has been incorporated with $50,000 capital to manufacture household appliances, by Victor Major, 1205 Pallister St.

DETROIT—Westward Washing Machine Co., 7400 St. Aubin Ave., has been incorporated with $250,000 capital to manufacture washing machines, by Wesley B. Bennett, 14340 Rutland Rd.

DETROIT—Syncro-Cut Service Co., 3138 East McNichols Rd., has been incorporated with $10,000 capital to manufacture syncro-cut disintegrator drills and appliances, by Arthur W. Koch, 11152 Chalmers Ave.

DETROIT—Michigan Lead Co., 2005 Vulcan Ave., has been incorporated with $50,000 capital to manufacture storage batteries, by Charles W. Ross, 4200 Glendale Ave.

DETROIT—Deluxe Battery Co., 7541 Linwood Ave., has been incorporated with $10,000 capital to manufacture storage batteries, by Roy J. Parshall, same address.

DETROIT—Kates Steel Inc., 16670 Stansbury Ave., has been incorporated with $10,000 capital to do steel fabricating, machine work and welding, by Ernest E. Kates, same address.

DETROIT—McFair Mfg. Co., 20327 Reid Highway, has been incorporated with $50,000 capital to manufacture farm tools, implements and equipment, by Louis A. McCoy, 2311 Puritan Ave.

DETROIT—Beverage Dispensing & Cooling Inc., has been incorporated with $5000 capital and 500 shares no par value to manufacture beverage cooling units, by W. Lloyd Waters, same address.

DETROIT—Hall Dodds Mfg. Co., 9530 Livernois Ave., has been incorporated with $50,000 capital to manufacture motors and automobiles, by Bruce R. Dodds, same address.

DETROIT—Kitchen-Kraft Shops Inc., 659 Philip Ave., has been incorporated with $45,000 capital to manufacture household and business appliances, by Lea N. Burrows, 18040 Greenfield Ave.

DETROIT—Meyer Stark Mfg. Co., 4501 Wesson St., has let contract to Campbell Construction Co., 3255 Goldner St., for a one-story metalworking plant to cost about $50,000.

DETROIT—L. A. Young Spring & Wire Corp., 9200 Russell St., has let contract to O. W. Burke Co., 1032 Fisher Bldg., for warehouse, laboratory and trainshed with craneway, to cost about $250,000. C. W. Brandt, 10114 Talbot Ave., Huntington Woods, Royal Oak, Mich., is architect.

EAST DETROIT, MICH. — Keystone Metal Molding Co., 16410 Stephens Drive, has been incorporated with $500,000 capital to manufacture tools, machinery and fixtures, by Alexander Carlin, same address.

ECORSE, MICH.—Ecorse Screw Machine Products Inc., 70 White St., has been incorporated with $250,000 capital to manufacture tools, machinery and equipment, by Joseph Magyar, same address.

FERNDALE, MICH.—Detroit Steel Sash Co., 760 East Breckenridge St., has been incorporated with $10,000 capital to manufacture steel sash, by William J. Luski, 799 Emerson Ave., Detroit.

GRAND HAVEN, MICH.—Electrical Assemblies Inc., 226½ Washington Ave., has been incorporated with $40,000 capital and 4000 shares no par value to do general manufacturing, by Adrian A. DeVos, 99 Houston Ave.

GRAND RAPIDS, MICH.—Allwood & Son Gear & Machinery Co., 3200 Coit Rd., has been incorporated with $175,000 capital to manufacture gears and machinery, by John Allwood Jr., same address.

GRAND RAPIDS, MICH.—Attwood Iron Industries Inc., 742 Front St. NW., has been incorporated with $300,000 capital to do general foundry and machine business, by H. B. Stillman, 612 Stephenson Bldg., Detroit.

HAZEL PARK, MICH.—Wolverine Wire Products Corp., 1671 East Nine Mile Rd., has been incorporated with 10,000 shares no par value to manufacture wire products, by Lynn J. Beardslee, 17174 Stout St., Detroit.

JACKSON, MICH.—Lincoln Mfg. Co., 808 East Michigan Ave., has been incorporated with $100,000 capital to manufacture compressors and refrigeration cooling apparatus, by Lewis M. Rishel, 163 West Territorial Rd., Battle Creek, Mich.

LANSING, MICH.—Strother Distributing Corp., 525 Tussig Bldg., has been incorporated with $50,000 capital to manufacture automotive and industrial parts, tools and supplies, by Glenn S. Strother, 1116 Jerome Ave.

MASSACHUSETTS

WALTHAM, MASS. — Reece Buttonhole Machine Co., 89 State St., plans a plant costing over $100,000.

WORCESTER, MASS. — Worcester Pressed Steel Co., 100 Barber Ave., will build a two-story cold storage plant 90 x 140 feet, to cost about $65,000.

WORCESTER, MASS.—Crompton & Knowles, 93 Grand St., has let contract to J. W. Bishop Co., 109 Foster St., for a one-story 30 x 75-foot dry kiln, second story additions and alterations to cost about $51,000.

CONNECTICUT

NEW BRITAIN, CONN.—R. J. King, South Mountain Dr., is having plans made for a plant for manufacture of tools, jigs and gages, on Diamond St., to cost about $40,000.

RHODE ISLAND

PROVIDENCE, R. I.—Hugold Johnson, Ernest St., plans a one-story 46 x 90-foot machine shop to cost about $40,000, including equipment.

OHIO

BEDFORD, O.—Lewis Welding & Engineering Corp., Interstate and Gross Sts., James T. Lewis Jr., president, is considering one or more additions to increase production and storage space.

CLEVELAND—N. B. M. Foundry Co. has been organized by William C. Manwell, 1036 Roanoke Rd., and will build a $25,000 plant at 4730 Warner Rd.

CLEVELAND — Cleveland Aircraft Tool & Die Co., 9016 Manor Ave., is having plans drawn by A. E. Schwemler, Citizens Bldg., for a one-story 100 x 130-foot plant and office building to cost about $60,000.

CLEVELAND—Cleveland Spring & Fastener Corp., is being organized by H. E. Dickison, attorney, Union Commerce Bldg.

CLEVELAND—U. S. Carbide Tool Inc., is being organized by Stanley Florek, 3664 East 59th St. for manufacture of tungsten carbide cutting tools and wearing parts.

DAYTON, O.—Chrysler Air-Temp Division of Chrysler Corp., 12200 East Jefferson Ave., Detroit, has let contract to Ferro Construction

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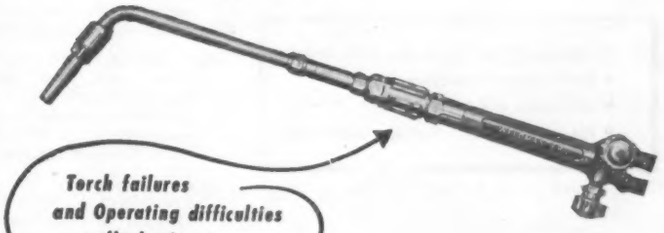

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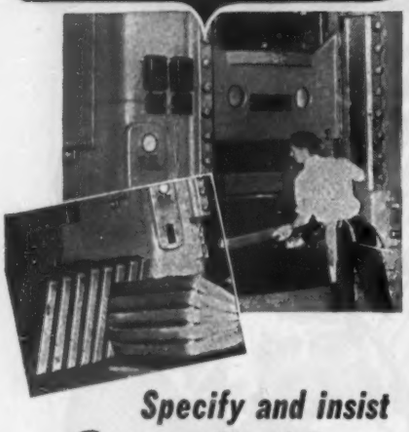

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STRENES METAL
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Co., 203 W. Third St., Cincinnati, for a plant to cost about $250,000.

NILES, O.—National Bearing Division of American Brake Shoe Co., 230 Park Ave., New York, E. A. Williams, works manager, will build $300,000 plant on former Thomas sheet mill site. Plan is for 160 x 200-foot building for manufacture of railroad car journal bearings.

TOLEDO, O. — Robinwood Hospital, 2517 Robinwood St., N. Bischoff, president, plans erection of one-story 40 x 60-foot power plant, to cost about $65,000. Bellman, Gillet & Richards, 518 Jefferson St., are architects.

TOLEDO, O. — Mather Spring Co., Wolcott Bldg., has let contract to A. Bentley & Sons Co., 201 Belmont St., for a one-story 120 x 200-foot plant building to cost about $40,000.

WICKLIFFE, O.—Hendershot & Smith Heat Treating Co., care Ralph Hendershot, East 177th St., Euclid, O., has bought a seven-acre site on Lakeland Blvd. on which it plans a plant to employ about 100 workers.

YOUNGSTOWN—Simon Sheet Metal Co., 807 South Ave., is building a shop to cost about $11,000.

YOUNGSTOWN—Valley Steel Tank Co. Inc., 2563 Wilson Ave., Campbell, O., is leasing abandoned Haselton car barns for use as tank manufacturing plant, stamping plant and steel warehouse to be constructed.

ILLINOIS

CHICAGO—Chicago Spring & Bumper Co., 4647 West Lake St., plans to erect a plant addition and do remodeling, at cost of about $150,000. A. Epstein, 2001 West Pershing Road, is architect.

CHICAGO—Belden Mfg. Co., 4647 West Van Buren St., has let contract to Bulley & Andrews, 2040 West Harrison St., for a plant addition to cost about $400,000. W. F. Dolke, 189 West Madison St., is architect.

LINCOLNWOOD, ILL.—Bell & Howell, 1801 Larchmont Ave., Chicago, will let contract soon for a one-story 150 x 520-foot plant and warehouse. B. A. Gordon Co., 1 North LaSalle St., Chicago, is architect.

INDIANA

BEDFORD, IND. — Automatic Control Engineers Inc., care Chamber of Commerce, plans plant for manufacture of control equipment for gasoline power units, to cost about $40,000, with equipment.

LA PORTE, IND.—Allis-Chalmers Mfg. Co., West Allis, Wis., will let contract soon through Charles W. Cole & Son, engineers, 220 West LaSalle St., South Bend, Ind., for one-story 218 x 280-foot, plant building and 80 x 130-foot addition, to cost about $300,000.

NEW CASTLE, IND.—Ingersoll Steel Disc Co., division of Borg-Warner Corp., New Castle, plans additions and improvements to plant, to cost about $850,000, with equipment.

SOUTH BEND, IND.—Studebaker Corp. plans boilerhouse costing about $150,000. Plans are by Giffels & Vallet Inc., 1000 Marquette Bldg., Detroit.

MARYLAND

BALTIMORE—General Sales Service Co., 323 Park Ave., manufacturer of store fixtures, is building a one-story 16,000-square foot factory at 607 South Luzerne Ave.

BALTIMORE—City Steel Co., Joseph Fatalico, owner, is equipping building at 3206 East Fayette St. for machine fabrication and building truck bodies.

BALTIMORE—Western Electric Co. will start work shortly on a $6 million expansion of its Point Breeze plant. Addition to insulated wire and cable building will cover about 390,000 square feet. Space will be provided for other departments.

BALTIMORE — Buffalo Tank Corp., Buffalo, subsidiary of Bethlehem Steel Co., with plants at Buffalo and Dunellen, N. Y., will establish a plant here on part of site of Bethlehem-Fairfield Shipyard Inc. Oxygen plant of former Union Shipbuilding Co., will be part of the plant, and new construction will be undertaken. Product will be metal tanks.

BALTIMORE—Eastern Stainless Steel Corp., which recently doubled cold rolling capacity and increased polishing capacity 150 per cent, has under way further plant extensions.

ALABAMA

TUSCALOOSA, ALA.—Placid Oil Co., W. F. Dalton, president, City Bank Bldg., Shreveport, La., plans an oil refinery plant to cost $750,000. Hudson Engineering Co., 2711 Danville St., Houston, Tex., and Tuscaloosa, is engineer.

ARKANSAS

LITTLE ROCK, ARK.—Consolidated Chemical Industries, 630 Fifth Ave., New York, is having plans made for a chemical plant near here, to cost about $50,000.

WISCONSIN

MILWAUKEE—Nash-Kelvinator Corp., 3880 North Richards St., has let contract to Permanent Construction Co., 4100 North Third St., for a five-story plant addition 59 x 136 feet, to cost about $95,000. E. Abendroth, 1140 East Bywater Lane, is architect.

CALIFORNIA

BEVERLY HILLS, CALIF.—Payne Furnace Co., 341 North Maple Drive, is building an additional plant building costing about $135,000. Marshall P. Wilkinson, 6809 Hawthorne Blvd., is architect.

BURBANK, CALIF.—Lockheed Aircraft Corp., 2555 North Hollywood Way, has building permits for three manufacturing buildings, each 195 x 208 feet, to cost $150,000 each. In addition two structures 195 x 208 feet will cost $90,000 each.

LOS ANGELES—Plomb Tool Co., 2209 Santa Fe Ave., has building permit for a plant addition 60 x 125 feet, costing about $21,500.

LOS ANGELES—Zonnie Electric Tool Co., 2226 South San Pedro St., has plans for a plant addition 42 x 90 feet, to cost about $15,000.

LOS ANGELES—Pacific Gauge Co. has let contract to Buttress & McClellan Inc., 1013 East Eighth St., Los Angeles, for a plant addition, two stories, to cost $40,000.

PASADENA, CALIF.—Action Welding Co., 1478 East Colorado St., is erecting a plant building at 3260 East Foothill Blvd., 40 x 110 feet, to cost about $13,000.

POMONA, CALIF.—J. E. Kilgore has let contract to Nigg Engineering Co., Pomona, for a machine shop 50 x 80 feet, to cost about $14,000.

VERNON, CALIF.—Butler Engineering & Mfg. Co. has let contract to Buttress & McClellan Inc., 1013 East Eighth St., Los Angeles, for a plant building at Alcoa and Vernon Aves., 50 x 150 feet, to cost about $40,000.

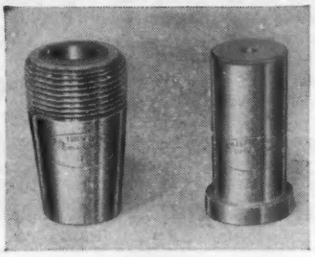
WATSON, CALIF.—Johns-Manville, 816 West Fifth St., is having plans prepared for extensions to transite pipe plant at 223rd St. and Alameda Blvd., 50 x 700 feet and 80 x 150 feet, with 800-foot crane runway, at cost of about $700,000.

WASHINGTON

LYNDEN, WASH.—Baker Cold Storage Co., John Harkop Jr., owner, has let contract to the Austin Co. at $150,000 for a reinforced concrete quick freezing and cold storage plant.

SEATTLE—Westlake Improvement Co., 740 Westlake North, plans a machine shop to cost about $7000.

WHEREVER BLASTING IS DONE!



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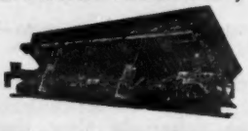

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25-Ton Whiting 106' Span
25-Ton Whiting 82' Span
20-Ton Alliance 77' Span
20-Ton Cleveland 65' Span
20-Ton Morgan 77' Span
20-Ton Northern 60' Span
20-Ton P&H 51'4" Span
20-Ton P&H 39'6" Span
20-Ton Shaw 76'4" Span
20-Ton Shepard Niles 49'6" Span
15-Ton Alliance 50' Span
15-Ton Alliance 35' Span
15-Ton Cleveland 55'6" Span
15-Ton Cleveland 35' Span
15-Ton Morgan 77' Span
15-Ton Niles 32' Span
15-Ton Northern 53' Span
15-Ton Shaw 82' Span
15-Ton Shaw 77' Span
15-Ton Toledo 82' Span
15-Ton Whiting 74'8½" Span
12-Ton Morgan 56' Span
10-Ton Alliance 88'9" Span
10-Ton "American" 27' Span
10-Ton Case 31'9" Span
10-Ton Cleveland 38' Span
10-Ton Cleveland 50' Span
10-Ton Lane 50' Span
10-Ton Morgan 39'5" Span
10-Ton Morgan 77' Span
10-Ton P&H 57' Span
10-Ton Northern 34' Span
10-Ton P&H 37'4" Span
10-Ton P&H 48'10½" Span
10-Ton P&H 60' Span
10-Ton P&H 80' Span
10-Ton P&H 87'6" Span
10-Ton Toledo 36' Span
10-Ton Manually Operated
7½-Ton Erie 70' Span
7½-Ton P&H 30'6" Span
7½-Ton Shepard 36' Span
6-7-Ton Milwaukee 70' Span
6-Ton Shaw 23' Span
5-Ton "American" 10' Span
5-Ten Champion 37'6" Span
5-Ton Euclid
5-Ton Milwaukee 39'8" Span
5-Ton Milwaukee 66'9" Span
5-Ton Milwaukee 70' Span
5-Ton Northern 49'6" Span
5-Ton P&H 45' Span
5-Ton Shaw-Box 25' Span
5-Ton Shepard 40' Span
5-Ton Toledo 96' Span
5-Ton Whiting 80' Span
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3-Ton Shaw 33' Span
3-Ton Whiting 57'3" Span
2-Ton Detroit 28' Span
2-Ton Louden 19'2" Span
2-Ton P&H 46'4" Span
2-Ton Shep. Niles 18' Span
2-Ton Shep. Niles 14' Span
1½-Ton Cleveland 28' Span
1½-Ton P&H 22'8" Span 34' Span
1-Ton Curtis 24' Span
½-Ton "American" 17' Span

Take advantage of the ECONOMY service by telephoning to us *collect*, which will enable us to discuss your requirements and present our suggestions.

In addition to overhead cranes we can supply all types of shovels, cranes, draglines, tractors, or practically everything in the equipment field. May we have your inquiries?

ECONOMY CO., Inc.
49 Vanderbilt Avenue, New York 17, N. Y.
Telephones: MUrrayhill 4-2294, 4-2893, 4-2295, 4-2844, 4-2296, 4-8292

FOR IMMEDIATE DELIVERY
ATTRACTIVE PRICES

TYPE 416 CD STAINLESS STEEL BARS

¼"	Sq.	2,667 lbs.
½"	Round	667 "
⅝"	Round	2,500 "
¾"	Round	1,166 "
39/64"	Round	7,163 "
¾"	Round	3,301 "
1 "	Round	1,233 "
1¼"	Round	500 "
1⅝"	Round	12,072 "
2 7/16"	Round	1,430 "
2½"	Round	795 "

TYPE 303 CD STAINLESS STEEL BARS

1"		1,314 "
1"		883 "
1"		1,716 "
1⅛"		8,893 "
1⅛"		4,270 "
1¼"		1,080 "
1 3/16"		3,573 "
2⅛"		1,020 "
2 7/16"		1,165 "
2½"		5,980 "

STAINLESS STEEL HEX BARS CD TYPE 416

⅝"		3,820 lbs.
¾"		2,110 "

TYPE 440 STAINLESS STEEL BARS

1 1/16"	792 lbs.	
2⅛"	2,688 "	
2 1/16"	2,580 "	440-F

SPRING STEEL ANNEALED SAE-1075
25,900 lbs. .062 x ½" x coils

SEAMLESS STEEL TUBING

Lbs.	
18,080	3.569" OD x .566" wall x 3' 6" long, CD AMS-6322-A
69,840	5½" OD x 55/64" wall x 16' long, HR AMS-6322-A
40,230	5 1/16" OD x 27/32" wall x 16' long, CD AMS-6322-A
4,010	3¼" OD x .220 wall x 16' long, HR SAE-4140

STAINLESS STEEL HEX BARS CD TYPE 303

1" ..... 807 lbs.

STAINLESS STEEL STRIP

Lbs.	
901	.032 x ⅛" wide Type 302, Soft
3,432	.043 x 24 x 108½ Type 302 ½ Hard, 2B finish, AN-QQS-772 Sheets

ALUMINUM SHEETS

Lbs.	
25,000	.125 x 66" dia., 24 SO Circles
1,613	.081 x 48 x 144 24 SO Alclad
1,400	.064 x 48 x 144 3 S ½ Hard
1,700	.064 x 24 x 96 3 S ½ Hard

Large tonnages other grades and sizes Aluminum Sheets and Rods Available.

ALUMINUM RODS

Lbs.	
10,000	1 1/16" 17 ST
1,853	1⅜" 17 ST
661	2⅛" 17 ST AMS 4118

Large tonnages other grades and sizes Aluminum Sheets and Rods Available.

Send us your list of needs, and also your lists of surplus metals.

MID-AMERICA NON FERROUS METAL CO.
624 South Michigan Ave., **Chicago 5, Illinois**
Harrison 1942

CLASSIFIED

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A going industrial business located in the Middle West involving $250,000 to $750,000 for factory and products having a large potential volume.

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All proposals will be held confidential and receive immediate consideration.

No brokers, please.

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Must be fully patented with a working model available and have large volume possibilities. All items submitted will receive confidential consideration. Principals only.

ADDRESS BOX 421

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FOR SALE, GOING STEEL AND INDUSTRIAL SUPPLY BUSINESS LOCATED IN SOUTHERN CALIFORNIA. PARTNERS RETIRING. INVESTMENT WILL INVOLVE ONE MILLION DOLLARS BUT TO A SOUND WELL RATED CONCERN A MOST ATTRACTIVE PROPOSITION WILL BE MADE. BUSINESS ESTABLISHED 20 YEARS AND WILL STAND STRICTEST INVETIGATION. REPLY BOX 442, STEEL, PENTON BLDG., CLEVELAND 18, O.

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Address your copy and instructions to STEEL, Penton Bldg., Cleveland 13, Ohio.

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Positions Wanted

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Canadian Representation for Stainless Sheet and Strip wanted by live Distributor covering Ontario and Quebec with Jobber connections throughout the balance of Canada.

Address Box 436,

STEEL, Penton Bldg., Cleveland 13, O.

Manufacturers' Representative

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Address Box 391

STEEL, Penton Bldg., Cleveland 13, O.

Manufacturer's Representative

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Address Box 338

STEEL, Penton Bldg., Cleveland 13, O.

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Eastern Michigan, Detroit office, Sales Engineer, Automotive and allied industries requirements. Broad background; wide acquaintance with established confidence in product represented. Die castings; plastics, auto-body interior components preferred. Qualifications also cover tubular products, drop forgings or stampings. Must be high grade established source desiring first-class aggressive overall representation. Address Box 415, STEEL, Penton Bldg., Cleveland 13, O.

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MANUFACTURERS' REPRESENTATIVE WITH established reputation and clientele, can accept one or two more lines in Detroit territory. Address Box 444, STEEL, Penton Bldg., Cleveland 13, O.

CLASSIFIED

Help Wanted

SALES REPRESENTATIVE

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SHEET METAL AND LIGHT STRUCTURAL concern (Cleveland, Ohio) doing industrial work desires a Plant Superintendent with A-1 references and character. Must have complete knowledge of sheet metal working machines. Must be able to layout all types of patterns, must be able to handle and supervise mechanics. State complete qualifications in application. All replies held in confidence. Address Box 416, STEEL, Penton Bldg., Cleveland 13, O.

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Large manufacturer in small Northern Indiana city has opening for factory manager. Must have proven production record with experience in manufacture of sheet metal appliances or products. Experience with porcelain plant desirable and good personnel record necessary. Opportunity to advance with a growing business. Address Box 452, STEEL, Penton Bldg., Cleveland 13, O.

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Help Wanted

DESIGNERS WANTED

First Class Designers on medium and heavy machinery. Must be experienced on rolling mill machinery and allied products. In reply state age, experience in full, education and salary expected.

TREADWELL ENGINEERING CO.
Easton, Pa.

Superintendent From Southern Area

Good position well established heavy industry, making large and heavy work. Location southeast. Must be experienced in Grey Iron Foundry, Machine Shop, and Plate Shop practices.

Write, giving outline of personal data and experience for past ten years. Address Box 455, STEEL, Penton Bldg., Cleveland 13, O.

ENGINEERS AND DRAFTSMEN — STRUCtural, experienced in heavy material handling equipment, such as cranes and waterfront unloading structures. Old established manufacturer. Vicinity New York. Reply stating experience, age, salary expected, when available. Address Box 409, STEEL, Penton Bldg., Cleveland 13, O.

Help Wanted

OPPORTUNITY FOR OUTSTANDING ADVERTISING & SALES PROMOTION MANAGER

Aggressive and leading manufacturer in the metals industry has position open of Sales Promotion and Advertising Manager. Decided executive experience required for complete charge of Advertising Department.

Responsible for complete planning and advertising activities, production of literature, copy, exhibits, etc. New York area.

Requisites: College. Previous experience similar capacity. Under 38.

Write giving complete resume together with photograph.

Address Box 448,
STEEL, Penton Bldg.,
Cleveland 13, O.

SALES MANAGER

With successful sales record by one of the leading manufacturers in the metal cutting tool industry. State age, education, experience, special qualifications and compensation desired. Address Box 430, STEEL, Penton Bldg., Cleveland 13, O.

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SPECIAL MANUFACTURERS TO INDUSTRY... *Since 1905*

Metal Specialties comprised of STAMPINGS, FORMING, WELDING, SPINNING, MACHINING. All Metal or Combined with Non-Metal Materials

Write for Folder

LARGE SCALE PRODUCTION
OR PARTS AND DEVELOPMENT ONLY

GERDING BROS.
SE THIRDVINE ST. • CINCINNATI 2, OHIO

SAY IT HERE

If you have facilities to handle additional work. An advertisement in this section will tell others of your capacity, etc. Write STEEL, Penton Bldg., Cleveland 13.

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SMALL STAMPING WORK
11, 12, 13, 14 gauge.

We have plenty of steel and can give fast delivery on the above gauges.

Also equipped to handle tool and die work.

Ohio Valley Tool & Die Co.
113 Washington St., Steubenville, Ohio

Send Your Inquiries for
SPECIAL ENGINEERING WORK
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A. H. NILSON MACHINE COMPANY, BRIDGEPORT, CONN.
designers and builders of wire and ribbon stock forming machines.
We also solicit your bids for cam milling

Automatic and Hand Screw Machine Products
Up to 2¼ inches - Any Metal
Drilling and Lathe Work.
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Plant—Chesterton, Ind.

AVAILABLE NOW
Expert
FORGING SERVICE

We forge, anneal & sandblast board hammer forgings of
1—All tool steels including Tungsten, Molybdenum and Cobalt High Speed Steels up to 3 lbs.
2—Carbon and alloy steels up to 25 lbs. Can also make your dies.

THE OK TOOL CO., SHELTON, CONN.
A Div. of Aerodynamic Research Corp.

Difficult
HARD CHROME and other
PLATING SERVICES
AGERSTRAND CORPORATION
Muskegon, Michigan

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AETNA-STANDARD

Milestone News About CONTINUOUS STRIP GALVANIZING

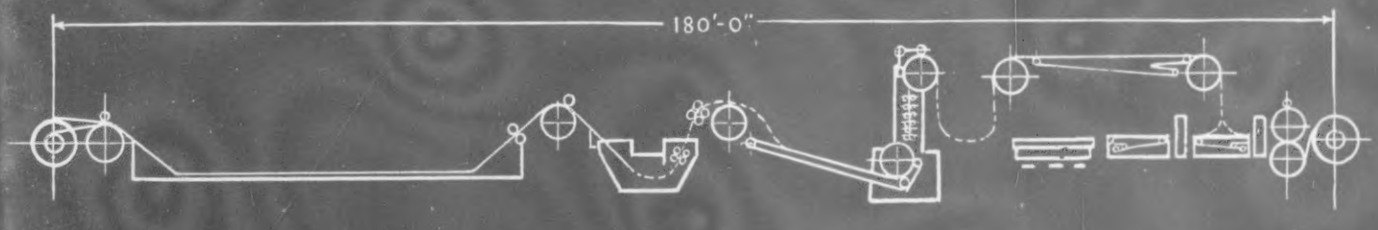
The steel industry passes an important technological milestone. Another production dream has come true.

Two of America's best-known mills are building the first high production continuous lines for hot dip galvanizing steel in coils . . . wide widths, light and heavy gauges.

Both companies have been experimenting for many years in search for the answer. Each has arrived at certain exclusive features which have been protected by patents.

Aetna-Standard has been called in to do the designing, engineering and mechanical work on both lines. Aetna-Standard feels proud that these mills have the confidence to hand over exclusive and confidential data about this important milestone in the steel industry.

Breathing production life into ideas is our business.



Here's a schematic drawing of a continuous terne line. Aetna-Standard pioneered in the development of this equipment for wide coils.

★ Since the early days of the cooling wheel, Aetna-Standard has introduced many new ideas in coating equipment. We were the first to commercially produce a continuous line for drying, the originators of the completely synchronized roll drive; straight line galvanizing, high speed sheet galvanizing and now continuous strip galvanizing.

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YOUNGSTOWN, OHIO

ASSOCIATED COMPANIES:

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JOHN INGLIS COMPANY, LIMITED, TORONTO, ONTARIO, CANADA

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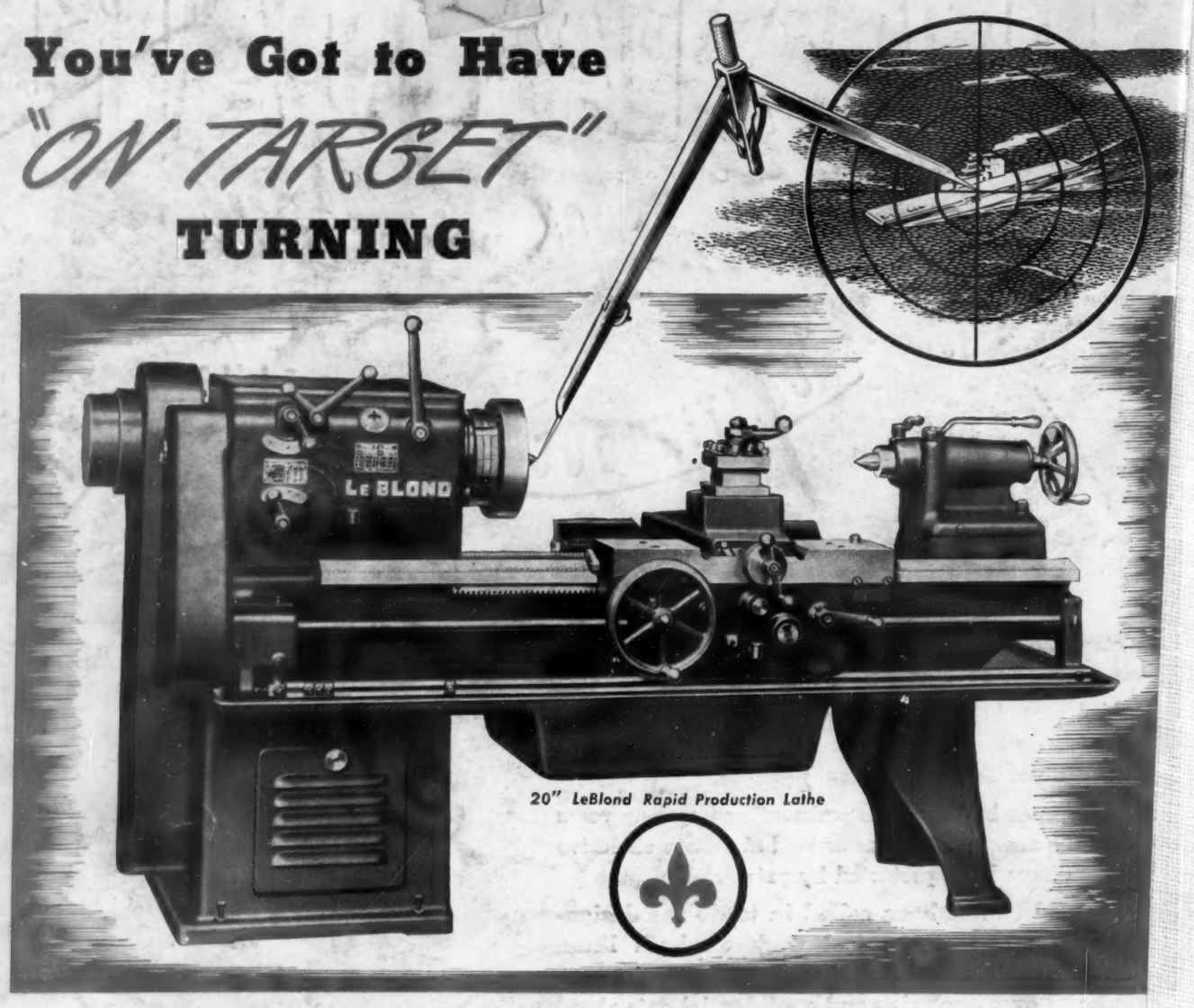

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Are you shooting with a '36 or a '46?

● Near misses in your metal cutting build production losses—penalize pricing, marketing opportunities—nick your profits. No manufacturer can hope to hit his target of competitive price when "near misses" of obsolete lathes have to stand up to the "on target" onslaught of up-to-date metal turning competition.

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More than 50% of Industry's production and tool room lathe are more than 10 years old. How many are in your plant

For Timed Turning that Cuts Costs
It takes a Le Blond

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Chicago 6, 20 N. Wacker Drive, STA 5561

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OF CURRENT ADVERTISERS

in

STEEL

The Magazine of Metalworking and Metalproducing

PENTON BUILDING
CLEVELAND 13, OHIO

FEBRUARY, 1946

List of current advertisers in STEEL beginning on page 43.

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THE PRODUCTS manufactured by STEEL's advertisers are listed alphabetically for your convenience in this Where-To-Buy Directory. It represents a carefully selected list of suppliers upon whom you can depend as leaders in their respective fields of manufacture. Whenever you are in need of materials, equipment or services you will find these companies well equipped to serve you.

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For further information on any of the products or services listed in this directory, please write the advertisers direct or if STEEL can be of any special service do not hesitate to call on us.

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General Abrasive Co., Inc., College Ave. & Hyde Park Blvd., Niagara Falls, N. Y.
Peninsular Grinding Wheel Co., 789 Meldrum Ave., Detroit 7, Mich.
Safety Grinding Wheel & Machine Co., P. O. Box 746, Springfield, O.
Simonds Abrasive Company, Tacony & Fraley Sts., Philadelphia 37, Pa.

ABRASIVES (Optical Grains)

General Abrasive Co., Inc., College Ave. & Hyde Park Blvd., Niagara Falls, N. Y.
Simonds Abrasive Company, Tacony & Fraley Sts., Philadelphia 37, Pa.

ABRASIVES (Polishing)

Carborundum Co., The, Niagara Falls, N. Y.
Chicago Wheel & Manufacturing Co., Dept. ST.—1101 W. Monroe St., Chicago 7, Ill.
General Abrasive Co., Inc., College Ave. & Hyde Park Blvd., Niagara Falls, N. Y.
Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.
Norton Co., Worcester 6, Mass.
Simonds Abrasive Company, Tacony & Fraley Sts., Philadelphia 37, Pa.

ACCUMULATORS AND CONTROLS

Aldrich Pump Co., The, 8 Pine St., Allentown, Pa.
Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Baldwin Southwark Div., Baldwin Locomotive Works, Paschall P. O., Philadelphia 42, Pa.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
Wood, R. D., Co., 400 Chestnut St., Philadelphia 5, Pa.

ACETYLENE

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Independent Engineering Co., 105 W. Second St., O'Fallon, Ill.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.

ACID-PROOF LININGS

Ceilcote Co., 750 Rockefeller Bldg., Cleveland 13, O.
Goodrich, B. F., Co., The, Akron 18, O.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Hall Engineering Co., 12903 Elmwood Ave., Cleveland 11, O.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
National Lead Co., 111 Broadway New York 6, N. Y.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.
Rheem Research Products, Inc., 206 Standard Oil Bldg., Baltimore 2, Md.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

AEROCASING

Lakeside Steel Improvement Co., The, 5418 Lakeside Ave., Cleveland 14, O.

AGITATORS

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.

Porter, H. K., Company, Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.

AIR CONDITIONING EQUIPMENT

American Air Filter Co., Inc., 443 Central Ave., Louisville 8, Ky.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
General Electric Co., Air Conditioning & Commercial Refrigeration Div. Sec. 4412), Bloomfield, N. J.
Niagara Blower Co., Dept. S-105, 6 E. 45th St., New York 17, N. Y.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.
Salem Engineering Co., Air Conditioning and Refrigeration Div., 714 S. Broadway, Salem, O.
Schneible, Claude B., Co., 2827 25th St., Detroit 16, Mich.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Weatherhead Co., The, 300 E. 131st St., Cleveland 8, O.
Westinghouse Electric Corp., 653 Page Blvd., Springfield 2, Mass.

AIRCRAFT ACCESSORIES, PARTS SUPPLIES

Allied Products Corp., 4646 Lawton St., Detroit 8, Mich.
Canton Drop Forging & Mfg. Co., The, Canton 2, O.
Chandler Products Corp., Euclid 17, O.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Cleveland Pneumatic Tool Co., The, 3781 E. 77th St., Cleveland 5, O.
Cutler-Hammer, Inc., 1310 St. Paul Ave., Milwaukee 1, Wis.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Dow Corning Corp., P. O. Box 592, Midland, Mich.
Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.
Garrett, George K., Co., Inc., 1421 Chestnut St., Philadelphia 2, Pa.
General Electric Co., Bridgeport 2, Conn.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Mullins Mfg. Co., Warren, O.
National Screw & Mfg. Co., The, 244 E. 75th St., Cleveland 4, O.
Parish Pressed Steel Co., Reading, Pa.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.
Steel and Tubes, Div. Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.
Steel Improvement & Forge Co., 942 E. 64th St., Cleveland 14, O.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.
U. S. Automatic Corp., Amherst, O
Wagner, E. R., Mfg. Co., 4615 N. 32nd St., Milwaukee 9, Wis.
Weatherhead Co., The, 300 E. 131st St., Cleveland 8, O.
Western Automatic Machine Screw Co., Elyria, O.

AIRLESS BLAST CLEANING EQUIPMENT

American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.

AIRPLANES

Consolidated Vultee Aircraft Corp., 3301 Pacific Highway, San Diego, Cal.

ALLOY METALS (Nonferrous)—See METALS (Nonferrous)

ALLOY STEELS (Heat Resistant)

Allegheny Ludlum Steel Corp., Dept. S47, Breckenridge, Pa. Brackenridge, Pa.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Michiana Products Co., Michigan City, Ind.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.

ALLOYS (Ferroalloys)—See FERROALLOYS

ALLOYS (Heat Resistant)

Allegheny Ludlum Steel Corp., Dept. S47, Brackenridge, Pa.
American Cast Iron Pipe Co., 2030 N. 16th St., Birmingham 2, Ala.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Haynes Stellite Co., 30 E. 42nd St., New York 17, N. Y.
Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
International Nickel Co., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.

ALLOYS (Magnesium)

American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich
Dow Chemical Co., The, Midland, Mich.

ALLOYS (Nonferrous)

American Brass Co., The, Waterbury 88, Conn.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Bunting Brass & Bronze Co., The, 715 Spencer St., Toledo 1, O.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y
Handy & Harman, 82 Fulton St., New York 7, N. Y.
Haynes Stellite Co., 30 E. 42nd St., New York 17, N. Y.
International Nickel Co. Inc., The, 67 Wall St., New York 5, N. Y.
Metal Hydrides, Inc., 12-24 Congress St., Beverly, Mass.
New Jersey Zinc Co., 160 Front St., New York 7, N. Y.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Riverside Metal Co., Riverside, N. J.
Western Brass Mills, Div. of Olin Industries, East Alton, Ill.

ALLOYS (Silver)

Handy & Harman, 82 Fulton St., New York 7, N. Y.

ALUMINUM (Screw Stock)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

ALUMINUM AND ALUMINUM ALLOYS

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Reliance Steel Corp. Div Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

ANGLES—See BEAMS, CHANNELS, ANGLES

ANNEALING (Tempering)

Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Lakeside Steel Improvement Co., The, 5418 Lakeside Ave., Cleveland 14, O.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., New York 23, N. Y.
Perfection Tool & Metal Heat Treating Co., 1740-58 W. Hubbard St., Chicago 22, Ill.

ANNEALING BOXES

Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Foundry & Machine Co., E. Chicago, Ind.
General American Transportation Corp., 514c Graybar Bldg., New York 17, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
National Annealing Box Co., Washington, Pa.
National Erie Corp., Erie, Pa.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Rolock, Inc., 1380 Kings Highway, Fairfield, Conn.
Union Steel Castings Div. of Blaw-Knox Co., 62nd & Butler Sts., Pittsburgh 1, Pa.
United Engineering & Foundry Co., First National Bank Bldg., Pittsburgh 22, Pa.
Wean Engineering Co., Inc., The, Warren, O.
Wilson, Lee, Engineering Co., 2005 Lake Rd., Cleveland 16, O.
Youngstown Welding & Engineering The, 3711 Oakwood Ave., Youngstown 9, O.

ANNEALING COVERS

Blaw-Knox Div. of Blaw-Knox Co. Blawnox, Pa.
General American Transportation Corp., 514C Graybar Bldg., New York 17, N. Y.
National Annealing Box Co., Washington, Pa.
Pennsylvania Industrial Engineers, Div. Union Mining Co., 2413 W. Magnolia St., Pittsburgh 12, Pa.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Wean Engineering Co., Inc., The, Warren, O.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

ANODES (All Types)

American Brass Co., The, Waterbury 88, Conn.
duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

ANODES (Lead & Lead Alloy)

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
National Lead Co., 111 Broadway, New York 6, N. Y.

ANODES (Nickel)

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Hanson-Van Winkle-Munning Co. Matawan, N. J.
Seymour Manufacturing Co., The. 51 Franklin St., Seymour, Conn.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

ANODES (Silver)

Handy & Harman, 82 Fulton St., New York 7, N. Y.

ANODES (Zinc)

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
New Jersey Zinc Co., 160 Front St., New York 7, N. Y.

ARCHITECTS

Associated Engineers, Inc., 230 E. Berry St., Fort Wayne 2, Ind.

ASSEMBLIES (Mechanical-Electrical)

Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.

AUTOMOTIVE ACCESSORIES, PARTS, SUPPLIES

Blood Brothers Machine Co., Allegan, Mich.
Canton Drop Forging & Mfg. Co., The, Canton 2, O.
Chandler Products Corp., Euclid 17, O.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Cleveland Pneumatic Tool Co., The, 3781 E. 77th St., Cleveland 5, O.
General Electric Co., Bridgeport 5, Conn.
Kropp Forge Co., 5801 W. Roosevelt Rd., Chicago 50, Ill.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Parish Pressed Steel Co., Reading, Pa.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.
Standard Steel Spring Co., Coraopolis, Pa.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Steel Parts Mfg. Corp. Div. of Blackstone Mfg. Co., 226 S. Morgan St., Chicago 7, Ill.
Stewart-Warner Corp., Alemite Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.
U. S. Automatic Corp., Amherst, O.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.
Weatherhead Co., The, 300 E. 131st St., Cleveland 8, O.

AXLES

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Clark Equipment Co., Buchanan, Mich.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.

BABBITT METAL

Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Cadman, A. W., Mfg. Co., 28th & Smallman Sts., Pittsburgh 22, Pa.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
National Lead Co., 111 Broadway, New York 6, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Ziv Steel & Wire Co., 2945 W. Harrison St., Chicago 12, Ill.

BALANCING MACHINES

Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.

BALING PRESSES

Baldwin Southwark Div., Baldwin Locomotive Works, The, Faschall P. O., Philadelphia 42, Pa.
Galland-Henning Manufacturing Co., 2747 S. 31st St., Milwaukee 7, Wis.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.

BALL JOINTS (Automotive and Aircraft)

Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Tenrek, J. J., Mfg. Co., 4701-11 West 16th St., Chicago 50, Ill.

BALLS (Brass or Bronze)

Atlas Ball Div., SKF Industries, Inc., Philadelphia 34, Pa.
Strom Steel Ball Co., 1850 S. 54th Ave., Cicero 50, Ill.

BALLS (Grinding)

Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Taylor-Wharton Iron & Steel Co., Easton, Pa.

BALLS (Special Alloy Metals)

Atlas Ball Div., SKF Industries, Inc., Philadelphia 34, Pa.

BALLS (Steel) (*Also Stainless)

*Atlas Ball Div. SKF Industries, Inc., Philadelphia 34, Pa.
Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
*Strom Steel Ball Co., 1850 S. 54th Ave., Cicero 50, Ill.

BAND SAW GUIDES

McGill Mfg. Co., Inc., Valparaiso, Ind.

BANDS AND HOOPS (Iron and Steel)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Caine Steel Co., 1820 N. Central Ave., Chicago 39, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Cleveland Welding Co., The, W. 117th St. & Berea Rd., Cleveland 7, O.
Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Stanley Works, The, New Britain, & Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.

BAR MACHINING EQUIPMENT

Pines Engineering Co., 215 S. Highland, Aurora, Ill.

BARGE MOVERS

Robins Conveyors, Inc., 262 Passaic Ave, Passaic, N. J.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.

BARGES (Steel)

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Avondale Marine Ways, Inc., Westwego, La.
Bethlehem Steel Co., Bethlehem, Pa.
Federal Shipbuilding & Dry Dock Co., Kearny, N. J.
Ingalls Iron Works Co., The, Birmingham 2, Ala.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.

BARGES (Wood)

Koppers Co., Wood Preserving Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

BARRELS (Aluminum)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

BARRELS (Plating)

Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

BARRELS (Rubber Lined)

Goodrich, B. F., Co., The, Akron 18, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

BARRELS (Steel)

Rheem Research Products, Inc., 206 Standard Oil Bldg., Baltimore 2, Md.

BARRELS (Tumbling)

Ransohoff, N., Inc., 1317 Township Ave., Cincinnati 16, O.

BARS (Alloy Steel)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Ampco Metal Inc., Dept. S12, Milwaukee 4, Wis.
Babcock & Wilcox Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Bissett Steel Co., The, 945 E. 67th St., Cleveland 8, O.
Bliss & Laughlin, Inc., Harvey, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Columbia Steel Co., San Francisco 6, Calif.
Copperweld Steel Co., Warren, O.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
SKF Steels, Inc., 420 Lexington Ave., New York 17, N. Y.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wyckoff Steel Co., P. O. Box 1256, Pittsburgh 30, Pa.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

BARS (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Dow Chemical Co., The, Midland, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

BARS (Brass, Bronze or Copper)

American Brass Co., The, Waterbury 88, Conn.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Bridgeport Brass Co., Bridgeport 2, Conn.
Bunting Brass & Bronze Co., The, 715 Spencer St., Toledo 1, O.
Copperweld Steel Co., Warren, O.
Johnson Bronze Co., 550 S. Mill St., New Castle, Pa.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Revere Copper & Brass Co., Inc., 230 Park Ave., New York 17, N. Y.
Riverside Metal Co., Riverside, N. J.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Shenango-Penn Mold Co., 457 W. Third St., Dover, O.
Western Brass Mills, Div. of Olin Industries, East Alton, Ill.

BARS (Cold Finished)—See STEEL (Cold Finished)

BARS (Concrete Reinforcing)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Foster, L. B., Co., Inc., P.O. Box 1647, Pittsburgh, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Sons, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

BARS (Iron)

Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.

BARS (Steel) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
American Petrometal Corp., 1102 Broadway at 11th St., Long Island City 2, N. Y.
*American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Atlantic Steel Products Co., 1330 N. 30th St., Philadelphia 21, Pa.
Avondale Marine Ways, Inc., Westwego, La.
*Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Benedict-Miller, Inc., 216 Clifford St., Newark 5, N. J.
*Bethlehem Steel Co., Bethlehem, Pa.
*Bissett Steel Co., The, 945 E. 67th St., Cleveland 8, O.
*Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
*Columbia Steel Co., San Francisco 6, Calif.
Continental Steel Corp., Kokomo, Ind.
*Copperweld Steel Co., Warren, O.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Enterprise Galvanizing Co., Almond & E. Firth Sts., Philadelphia 25, Pa.
*Firth-Sterling Steel Co., McKeesport, Pa.
*Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
*Midvale Co., The, Nicetown, Philadelphia 40, Pa.
*Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
*Republic Steel Corp., Dept. ST, Cleveland 4, O.
*Rustless Iron & Steel Corp., 3400 E. Chase St., Baltimore 13, Md.
*Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
SKF Steels, Inc., 420 Lexington Ave., New York 17, N. Y.
Stanley Works, The, New Britain & Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Brown-Marx Bldg., Birmingham 2, Ala.
Timken Roller Bearing Co., The, Steel & Tube Div. Canton 6, O.
*United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

BASES (Welded Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Cleveland Welding Co., The, 117th St. & Berea Rd., Cleveland 7, O.
Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.

BASES (Welded Steel) (Con.)

Duffin Iron Company, 37 W. Van Buren St., Chicago 5, Ill.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Van Dorn Iron Works Co., 2685 E. 79th St., Cleveland 4, O.
Warren City Mfg. Co., Warren, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

BASKETS (Perforated Metal)

Diamond Mfg. Co., Wyoming, Pa.

BASKETS (Wire and Metal)

Bethlehem Steel Co., Bethlehem, Pa.
Rolock, Inc., 1380 Kings Highway, Fairfield, Conn.
Steel Parts Mfg. Corp. Div. of Blackstone Mfg. Co., 226 S. Morgan St., Chicago 7, Ill.

BATHS (Heat Treating, Cyanide, Salt, Silicon)

Dow Corning Corp., P. O. Box 592, Midland, Mich.
duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728—2nd St. Minneapolis 11, Minn.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

BATTERIES (Storage)

Edison Storage Battery Div. of Thomas A. Edison, Inc., West Orange, N. J.
Electric Storage Battery Co., The, 19th St. & Allegheny Ave., Philadelphia 32, Pa.

BATTERY CHARGING APPARATUS

Clark Controller Co., The, 1146 E 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1310 St. Paul Ave., Milwaukee 1, Wis.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
General Electric Co., Schenectady 5, N. Y.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

BEAMS, CHANNELS, ANGLES ETC. (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Dow Chemical Co., The, Midland, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

BEAMS, CHANNELS, ANGLES, ETC. (Steel) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Atlantic Steel Products Co., 1330 N. 30th St., Philadelphia 21, Pa.
Avondale Marine Ways, Inc., Westwego, La.
*Bethlehem Steel Co., Bethlehem, Pa.
*Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Columbia Steel Co., San Francisco 6, Calif.
*Enterprise Galvanizing Co., Almond & E. Firth Sts., Philadelphia 25, Pa.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Milton Mfg. Co., The, Milton, Pa.
*Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

BEARINGS (Aluminum, Brass or Bronze)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Ampco Metal, Inc., Dept. 512, Milwaukee 4, Wis.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Bunting Brass & Bronze Co., The, 715 Spencer St., Toledo 1, O.
Cadman, A. W., Mfg. Co., 28th & Smallman Sts., Pittsburgh 22, Pa.
Johnson Bronze Co., 550 S. Mill St., New Castle, Pa.
McGill Mfg. Co., Inc., Valparaiso, Ind.
Moraine Products Div., General Motors Corp., Dayton 1 O.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Shenango-Penn Mold Co., 457 W. Third St., Dover, O.

BEARINGS (Babbitt)

Bunting Brass & Bronze Co., The, 715 Spencer St., Toledo 1, O.
Johnson Bronze Co., 550 S. Mill St., New Castle, Pa.
Link-Belt Co., 2410 W. 18th St., Chicago 8, Ill.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.
Medart Co., The 3500 DeKalb St., St. Louis 18, Mo.
Moraine Products Div., General Motors Corp., Dayton 1, O.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
National Lead Co., 111 Broadway New York 6, N. Y.

BEARINGS (Ball)

Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Bearings Co. of America, Lancaster, Pa.
Dodge Manufacturing Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
Link-Belt Co., 519 N. Holmes Ave., Indianapolis 6, Ind.
McGill Mfg. Co., Inc., Valparaiso, Ind.
New Departure, Division of General Motors Corp., Bristol, Conn.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia 34, Pa.

BEARINGS (Graphite)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BEARINGS (Journal)

Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Dodge Manufacturing Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Bearings Division, General Motors Corp., Harrison, N. J.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
Link-Belt Co., 2410 W. 18th St., Chicago 8, Ill.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
National Lead Co., 111 Broadway, New York 6, N. Y.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Rollway Bearing Co., Inc., 541 Seymour St., Syracuse 4, N. Y.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia 34, Pa.
Timken Roller Bearing Co., The, Canton 6, O.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BEARINGS (Needle)

Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
McGill Mfg. Co., Inc., Valparaiso, Ind.
Torrington Co., The, Torrington, Conn.

BEARINGS (Nonmetallic)

Goodrich, B. F. Co., The, Akron 18, O.
Harris Products Co., 634 Huron Rd., Cleveland 15, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BEARINGS (Oilless)

Johnson Bronze Co., 550 S. Mill St., New Castle, Pa.
Moraine Products Div., General Motors Corp., Dayton 1, O.
Rhoades, R. W., Metaline Co., Inc., 50-17 Fifth St., Long Island City 1, N. Y.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BEARINGS (Quill)

Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
McGill Mfg. Co., Inc., Valparaiso, Ind.

BEARINGS (Radial)

American Roller Bearing Co., 416-420 Melwood St., Pittsburgh 13, Pa.
Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Bearings Co. of America, Lancaster, Pa.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Bearings Division, General Motors Corp., Harrison, N. J.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
McGill Mfg. Co., Inc., Valparaiso, Ind.
Medart Co., The 3500 DeKalb St., St. Louis 18, Mo.
New Departure, Div. of General Motors Corp., Bristol, Conn.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Rollway Bearing Co., Inc., 541 Seymour St., Syracuse 4, N. Y.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia 34, Pa.
Timken Roller Bearing Co., The, Canton 6, O.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BEARINGS (Roll Neck)

American Roller Bearing Co., 416-420 Melwood St., Pittsburgh 13, Pa.
Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Bearings Division, General Motors Corp., Harrison, N. J.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
Morgan Construction Co., Worcester 5, Mass.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Rollway Bearing Co., Inc., 541 Seymour St., Syracuse 4, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia 34, Pa.
Timken Roller Bearing Co., The, Canton 6, O.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BEARINGS (Roller)

American Roller Bearing Co., 416-420 Melwood St., Pittsburgh 13, Pa.
Atlantic Gear Works, 200 Lafayette St., New York 12, N. Y.
Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Dodge Manufacturing Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Bearings Division, General Motors Corp., Harrison, N. J.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
Link-Belt Co., 519 N. Holmes Ave., Indianapolis 6, Ind.
McGill Mfg. Co., Inc., Valparaiso, Ind.
Medart Co., The 3500 DeKalb St., St. Louis 18, Mo.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Rollway Bearing Co., Inc., 541 Seymour St., Syracuse 4, N. Y.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia 34, Pa.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.
Timken Roller Bearing Co., The, Canton 6, O.

BEARINGS (Roller Tapered)

Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Dodge Manufacturing Corp., Mishawaka, Ind.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
Medart Co., The 3500 DeKalb St., St. Louis 18, Mo.
Timken Roller Bearing Co., The, Canton 6, O.

BEARINGS (Rolling Mill)

American Roller Bearing Co., 416-420 Melwood St., Pittsburgh 13, Pa.
Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
Morgan Construction Co., Worcester 5, Mass.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Norma-Hoffman Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia 34, Pa.
Timken Roller Bearing Co., The, Canton 6, O.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BEARINGS (Sealed)

Bearings Company of America, Lancaster, Pa.
McGill Mfg. Co., Inc., Valparaiso, Ind.
New Departure, Div. of General Motors, Bristol, Conn.
Norma-Hoffman Bearings Corp., Stamford, Conn.

BEARINGS (Shaft Hanger)

Dodge Manufacturing Corp., Mishawaka, Ind. Indianapolis 6, Ind.
Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.
Medart Co., The 3500 DeKalb St., St. Louis 18, Mo.
Norma-Hoffman Bearings Corp., Stamford, Conn.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BEARINGS (Thrust)

American Roller Bearing Co., 416-420 Melwood St., Pittsburgh 13, Pa.
Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Bearings Co. of America, Lancaster, Pa.
Fafnir Bearing Co., New Britain, Conn.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
McGill Mfg. Co., Inc., Valparaiso, Ind.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Rollway Bearing Co. Inc., 541 Seymour Ave., Syracuse 4, N. Y.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia 34, Pa.
Timken Roller Bearing Co., The, Canton 6, O.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BELTING (Conveyor)

Boston Woven Hose & Rubber Co., P.O. Box 1071, Boston 8, Mass.
Goodrich, B. F., Co., The, Akron 18, O.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Steel Parts Mfg. Corp. Div. of Blackstone Mfg. Co., 226 S. Morgan St., Chicago 7, Ill.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

BELTING (Flat Transmission)

Boston Woven Hose & Rubber Co., P. O. Box 1071, Boston 3, Mass.
Goodrich, B. F., Co., The, Akron 18, O.
Graton & Knight Co., 322 Franklin St., Worcester 4, Mass.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Manheim Mfg. & Belting Co., Manheim, Pa.

BELTING (V-Drive)

Gates Rubber Co., The, 999 S. Broadway, Denver 17, Colo.
Goodrich, B. F., Co., The, Akron 18, O.
Manheim Mfg. & Belting Co., Manheim, Pa.

BENDING AND STRAIGHTENING MACHINES

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Alliance Machine Co., Alliance, O.
American Broach & Machine Co., Ann Arbor, Mich.
American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Bigwood, Joshua, & Son Ltd., Wolverhampton, England.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Cleveland Crane & Engineering Co., The, Steelweld Machinery Div., The, 1125 E. 283rd St., Wickliffe, O.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Federal Foundry Supply Co., The, 4600 E. 71st St., Cleveland 5, O.
Hallden Machine Co., The, Thomaston, Conn.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Kardong Bros., Inc., 846 Buchanan St., Minneapolis 13, Minn.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Lewis Machine Co., 3450 E. 76th St., Cleveland 4, O.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Littell, F. J., Machine Co., 4165 N. Ravenswood Ave., Chicago 13, Ill.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Morgan Engineering Co., The, Alliance, O.
O'Neil-Irwin Mfg. Co., 804 6th Ave. S., Minneapolis 15, Minn.
Pines Engineering Co., 215 S. Highland, Aurora, Ill.
Sutton Engineering Co., Bellefonte, Pa.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
Verson Allsteel Press Co., 1355 E. 93rd St., Chicago 19, Ill.
Wean Engineering Co., Inc., The, Warren, O.
Webb Corp., The, Webb City, Mo.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

BENZOL AND TOLUOL RECOVERY PLANTS

Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

BILLETS (Forging)

Alan Wood Steel Co., Conshohocken, Pa.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Copperweld Steel Co., Warren, O.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Harrisburg Steel Corp., Harrisburg, Pa.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
SKF Steels, Inc., 420 Lexington Ave., New York 17, N. Y.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Stanley Works, The, New Britain & Bridgeport, Conn.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

BILLETS AND BLOOMS (Alloy & Carbon Steel) (*Also Stainless)

*Alan Wood Steel Co., Conshohocken, Pa.
*Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa
Continental Steel Corp., Kokomo, Ind.
*Copperweld Steel Co., Warren, O.
Firth-Sterling Steel Co., McKeesport, Pa.
*Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Harrisburg Steel Corp., Harrisburg, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
*Midvale Co., The, Nicetown, Philadelphia 40, Pa.
*Republic Steel Corp., Dept. ST, Cleveland 4, O.
Roebling's, John A., Sons Co., Trenton, N. J.
SKF Steels, Inc., 420 Lexington Ave., New York 17, N. Y.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Stanley Works, The, New Britain & Bridgeport, Conn.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Washburn Wire Co., Phillipsdale, R. I.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

BILLETS—ALUMINUM (Forging)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

BLACKING (Graphite)

Federal Foundry Supply Co., The, 4600 E. 71st St., Cleveland 5, O.

BLAST FURNACE AIR CONDITIONING

Associated Engineers, Inc., 230 E. Berry St., Ft. Wayne 2, Ind.
Koppers Co., Engineering & Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.

BLAST FURNACE CLEANING (Gas)

McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O

BLAST FURNACE HOISTS

Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

BLAST FURNACE SPECIALTIES

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Brosius, Edgar E., Co., Sharpsburg P. O., Pittsburgh 15, Pa.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.

BLAST FURNACE STOCK HOUSES

McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.

BLAST FURNACE STOVES

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
McKee, Arthur G., & Co., 2300 Chester Ave.,

BLAST FURNACES

McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.
Pennsylvania Eng. Works, New Castle, Pa.

BLOCKS (Chain)

Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.

BLOW PIPE SYSTEMS

Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.

BLOW PIPES

Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.

BLOW PIPES (Oxy-Acetylene)

Black Mfg. Co., 1416-1428 W. Baltimore St., Baltimore 23, Md.
Linde Air Products Co., The, 30 East 42nd St., New York 17, N. Y.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

BLOWERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
DeLaval Steam Turbine Co., Trenton 8, N. J.
General Blower Co., Morton Grove, Ill.
General Electric Co., Schenectady 5, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.

BLUE PRINTING MACHINES AND ACCESSORIES

Wickes Brothers, Saginaw, Mich.

BODIES (Truck-Detachable)

Dempster Brothers, Inc., 294 Shea Rd., Knoxville 17, Tenn.

BOILER HEADS

Bethlehem Steel Co., Bethlehem, Pa.

BOILERS (Water Tube)

Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.

BOILER TUBES—See TUBES (Boiler)

BOLT AND NUT MACHINERY

Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Landis Machine Co., Waynesboro, Pa.
National Machinery Co., The, Tiffin, O.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.

BOLTS (*Also Stainless)

*Allied Products Corp., 4646 Lawton St., Detroit 8, Mich.
American Cast Iron Pipe Co., 2030 N. 16th St., Birmingham 2, Ala.
Bethlehem Steel Co., Bethlehem, Pa.
Boss Bolt & Nut Co., Div. of The Lock Nut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
*Camcar Products Co., Rockford, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Chandler Products Corp., Euclid 17, O.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
*Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
*Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
*Manufacturers Screw Products, 216 W. Hubbard St., Chicago 10, Ill.
Milton Mfg. Co., The, Milton, Pa.
*National Screw & Mfg. Co., the, 2440 E. 75th St., Cleveland 4, O.
*Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
*Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
*Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.

BOLTS (Carriage and Machine)

Bethlehem Steel Co., Bethlehem, Pa.
Boss Bolt & Nut Co., Div. of The Lock Nut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Camcar Products Co., Rockford, Ill.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2. O.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo
Milton Mfg. Co., The, Milton, Pa.
National Screw & Mfg. Co., The, 2440 E. 75 St., Cleveland 4, O.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Triplex Screw Co., 5341 Grant Ave., Cleveland 5, O.

BOLTS (Connecting Rod)

Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Chandler Products Corp., Euclid 17, O.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
U. S. Automatic Corp., Amherst, O.

BOLTS (Nonferrous)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Camcar Products Co., Rockford, Ill.
Chicago Screw Co., The, 1026 S. Homan Ave. Chicago 24, Ill.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
Manufacturers Screw Products, 216 W. Hubbard St., Chicago 10, Ill.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O
Oliver Iron & Steel Corp., S. 10th & & Muriel Sts., Pittsburgh 3, Pa.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
U. S. Automatic Corp., Amherst, O.

BOLTS (Shackle)

Bethlehem Steel Co., Bethlehem, Pa.
Chandler Products Corp., Euclid 17, O.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Russell, Burdsall, & Ward Bolt & Nut Co., Port Chester, N. Y.
Triplex Screw Co., 5341 Grant Ave., Cleveland 5, O.
U. S. Automatic Corp., Amherst, O

BOLTS (Special)

Allied Products Corp., 4646 Lawton St., Detroit 8, Mich.
Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Camcar Products Co., Rockford, Ill.
Chandler Products Corp., Euclid 17, O.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.
Milton Mfg. Co., The, Milton, Pa.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
U. S. Automatic Corp., Amherst, O.

BOLTS (Spring)

Bethlehem Steel Co., Bethlehem, Pa.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Triplex Screw Co., 5341 Grant Ave., Cleveland 5, O.
U. S. Automatic Corp., Amherst, O

BOLTS (Stove)

American Screw Company, Providence 1, R. I.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Triplex Screw Co., 5341 Grant Ave., Cleveland 5, O.

BOLTS (Stove, Recessed Head)

American Screw Co., Providence 1, R. I.
Bristol Co., The, Waterbury 91, Conn.
Chandler Products Corp., Euclid 17, O.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., 2440 E. 75th St., Cleveland 4, O.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Russell, Burdsall, & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
U. S. Automatic Corp., Amherst, O.

BOLTS (Track)

Allied Products Corp., 4646 Lawton St., Detroit 8, Mich.
Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
Milton Mfg. Co., The, Milton, Pa.
Oliver Iron & Steel Corp., S. 10th Muriel Sts., Pittsburgh 3, Pa.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.

BOLTS (Water Tight)

Boss Bolt & Nut Co. Div. of The Lock Nut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.

BOOTS (Safety)

Hy-Test Div. International Shoe Co., 1509 Washington Ave., St. Louis 3, Mo.
Lehigh Safety Shoe Co., Inc., Allentown, Pa.

BORING BARS

Bokum Tool Co., 14775 Wildermere Ave., Detroit 21, Mich.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

BORING BARS (Con.)

Universal Engineering Co., Frankenmuth, Mich.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

BORING MACHINES

National Automatic Tool Co., S. 7th & N Sts., Richmond, Ind.

BORING MILLS

Cincinnati Planer Co., Cincinnati 9, O.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Heald Machine Co., The, Worcester 6, Mass.
Moline Tool Co., 102 20th St., Moline, Ill.
Ohio Machine Tool Co., The, Kenton, O.
Stokerunit Corp., 4548 W. Mitchell St., Milwaukee 14, Wis.

BORING MILLS (Horizontal)

General Engineering & Mfg. Co., 1523 S. 10th St., St. Louis 4, Mo.

BORING MILLS (Vertical)

Bullard Co., The, Bridgeport 2, Conn.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Moline Tool Co., 102 20th St., Moline, Ill.

BORING TOOLS (Carbide Tipped)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Spe-D-Cut Tool Co., Hannibal, Mo.

BOXES (Export)

Rathborne, Hair & Ridgway Co., 1440 W. 21st Place, Chicago 8,

BOXES (Open Hearth Charging)

Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Foundry & Machine Co., E. Chicago, Ind.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Union Steel Castings Div., Blaw-Knox Co., 62nd & Butler Sts., Pittsburgh 1, Pa.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

BOXES (Wire Bound)

Rathborne, Hair & Ridgway Co. 1440 W. 21st Place, Chicago 8, Ill.

BOXES (Wood)

Rathborne, Hair & Ridgeway Co., 1440 W. 21st Place, Chicago 8, Ill.

BRAKE DRUMS

Bethlehem Steel Co., Bethlehem, Pa.
Ladish Drop Forge Co., Cudahy, Wis.

BRAKE LININGS

Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

BRAKES (Electric)

Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1310 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
General Electric Co., Schenectady 5, N. Y.

BRAKES (Hand)

O'Neil-Irwin Mfg. Co., 304 8th Ave. So., Minneapolis 15, Minn.

BRAKES (Hydraulic)

New York Air Brake Co., The, 420 Lexington Ave., New York 17, N. Y.

BRAZING

Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.

BRICK (Abrasive)

Chicago Wheel & Manufacturing Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Norton Co., Worcester 6, Mass.
Safety Grinding Wheel & Machine Co., P. O. Box 746, Springfield, O.
Sterling Grinding Wheel, The, Div. of The Cleveland Quarries Co., Tiffin, O.

BRICK (Acid Resisting)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BRICK (Chrome)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

BRICK (Fire Clay)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
National Foundry Sand Co., 2970 W. Grand Blvd., Detroit 2, Mich.
Remmey, Richard C., Son Co., Hedley St. & Delaware River, Philadelphia 37, Pa.

BRICK (Forsterite)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

BRICK (High Alumina)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

BRICK (Insulating)—See INSULATING BRICK

BRICK (Ladle)

Globe Brick Co., The, East Liverpool, O.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

BRICK (Magnesia)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

BRICK (Refractory)—See REFRACTORIES, CEMENT, ETC.

BRICK (Silica)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

BRICK (Silicon Carbide)

Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., The, Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Norton Co., Worcester 6, Mass.

BRICK (Sleeves, Nozzles, Runners, Tuyeres)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
National Fireproofing Corp., 202 E. Ohio St., Pittsburgh 12, Pa.

BRIDGE CRANES (Ore and Coal Handling)—See CRANES—BRIDGE (Ore & Coal Handling)

BRIDGES, BUILDINGS, VIADUCTS, STACKS, ETC.

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Bedford Foundry & Mach. Co., Bedford, Ind.
Belmont Iron Works, 22nd St. and Washington Ave., Philadelphia 46, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Duffin Iron Company, 37 W. Van Buren St., Chicago 5, Ill.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
General American Transportation Corp., 514C Graybar Bldg., New York 17, N. Y.
Ingalls Iron Works Co., The, Birmingham 2, Ala.
Levinson Steel Sales Co., 33 Pride St., Pittsburgh 19, Pa.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Stran Steel Div., Great Lakes Steel Corp., 607 Shelby Ave., Detroit, Mich.

BRIGHT HARDENING & ANNEALING

Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.

BRIQUETTING MACHINES

Vulcan Iron Works, Wilkes-Barre, Pa.

BROACHES

American Broach & Machine Co., Ann Arbor, Mich.
Bethlehem Steel Co., Bethlehem, Pa.
Colonial Broach Co., P. O. Box No. 37, Harper Sta., Detroit 13, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39, Ill.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.

BROACHING MACHINES

American Broach & Machine Co., Ann Arbor, Mich.
Cincinnati Milling Machine Co., Cincinnati 9, O.
Colonial Broach Co., P. O. Box No. 37, Harper Sta., Detroit 13, Mich.

BROACHING PRESSES (Hydraulic)

American Broach & Machine Co., Ann Arbor, Mich.

BRUSHES (Carbon)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BRUSHES (Industrial)

Fuller Brush Co., The, Industrial Div., 8c, 3582 Main St., Hartford 2, Conn.
Pittsburgh Plate Glass Co., Brush Div., 3221 Frederick Ave., Baltimore 29, Md.

BUCKETS (Clam Shell, Dragline, Excavating, Grab, Orange Peel, (Single Line)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Blaw-Knox Division of Blaw-Knox Co., Blawnox, Pa.
Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.

BUCKETS (Clam Shell, Dragline, Excavating, Grab, Orange Peel, Single Line) (Con.)

Erie Steel Construction Co., 961 Geist Rd., Erie, Pa.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago 5, Ill.
Osgood Co., The, Marion, O.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

BUCKETS (Electric)

Erie Steel Construction Co., 961 Geist Rd., Erie, Pa.
Owen Bucket Co., 6013 Breakwater Ave., Cleveland 2, O.

BUCKETS (Elevator)

Bartlett, C. O., & Snow Co., The 6200 Harvard Ave., Cleveland 5, O.
Diamond Mfg. Co., Wyoming, Pa.
Hendrick Mfg. Co., 87 Dundaff St., Carbondale, Pa.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.

BUCKETS (Rubber)

Goodrich, B. F., Co., The, Akron 18, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave.,

BUCKETS (Single Hook, Automatic Dump, Automatic Single Line)

Blaw-Knox Div. of Blaw-Knox Co. Blawnox, Pa.
Brosius, Edgar E. Co., Sharpsburg P. O., Pittsburgh 15, Pa.
Erie Steel Construction Co., 961 Geist Rd., Erie, Pa.
Owen Bucket Co., 6013 Breakwater Ave., Cleveland 2, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

BUFFERS (Electric Portable)

Chicago Wheel & Manufacturing Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.

BUILDINGS (Steel)—See BRIDGES BUILDINGS, ETC.

BULLDOZERS

Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.

BURNERS (Acetylene)—See TORCHES AND BURNERS

BURNERS (Automatic)

Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore 2, Md.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Salem Engineering Co., 714 S. Broadway, Salem, O
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Wilson, Lee, Engineering Co., Inc., 20005 Lake Rd., Cleveland 16, O.

BURNERS (Pulverized Coal, Oil, Gas, Combination, Sawdust)

Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Johnson Gas Appliance Co., 573 "E" Ave., N. W. Cedar Rapids, Iowa.
Maehler, Paul, Co., The, 2208 W. Lake St., Chicago 12, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Wilson, Lee, Engineering Co., 20005 Lake Rd., Cleveland 16, O.

BURNISHING, GRINDING, LAPPING OR POLISHING COMPOUNDS

Carborundum Co., The, Niagara Falls, N. Y.
Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.
Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.
Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Sun Oil Co., Dept. 1, 1608 Walnut St., Philadelphia 3, Pa.

BURRING MACHINES (Pipe & Tube)

Pines Engineering Co., 215 S. Highland, Aurora, Ill.

BUSHINGS (Bronze)

Ampco Metal Inc., Dept. S12, Milwaukee 4, Wis.
Cadman, A. W., Mfg. Co., 28th & Smallman St., Pittsburgh 22, Pa.
Johnson Bronze Co., 550 S. Mill St., New Castle, Pa.
Moraine Products Div., General Motors Corp., Dayton 1, O.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Shenango-Penn Mold Co., 457 W. Third St., Dover, O.
Wagner, E. R., Mfg. Co., 4615 N. 32nd St., Milwaukee 9, Wis.

BUSHINGS (Jig)

Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.
Universal Engineering Co., Frankenmuth, Mich.

BUSHINGS (Oilless)

Moraine Products Div., General Motors Corp., Dayton 1, O.
Rhoades, R. W., Metaline Co. Inc., 50-17 Fifth St., Long Island City 1, N. Y.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

BUTTS

Veeder-Root, Inc., Hartford 2, Conn.
Wagner, E. R., Mfg. Co., 4615 N. 32nd St., Milwaukee 9, Wis.

BY-PRODUCT PLANTS

Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

CABINETS (Refrigeration)

Deepfreeze, Div. of Motor Products Corp., 2309-7 Davis St., N. Chicago, Ill.
General Electric Company (Air Conditioning Div., Sec. 4412), Bloomfield, N. J.
Westinghouse Electric Corp., Mansfield, O.

CABINETS (Steel)

Mullins Mfg. Co., Warren, O.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.
Republic Steel Corp., Berger Mfg. Div., Canton 5, O.

CABLE (Electric)—See WIRE & CABLE (Electric)

CADMIUM

New Jersey Zinc Co., 160 Front St., New York 7, N. Y.
Udylite Corp., The 1651 E. Grand Blvd., Detroit 11, Mich.

CADMIUM PLATING PROCESSES AND EQUIPMENT

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

CALCIUM METAL AND ALLOYS

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Metal Hydrides, Inc., 12-24 Congress St., Beverly, Mass.

CAMERAS

Eastman Kodak Co., 343 State St., Rochester 4, N. Y.

CAMSHAFTS

Canton Drop Forging & Mfg. Co., The, Canton 2, O.
Ladish Drop Forge Co., Cudahy, Wis.

CANISTER

National Foundry Sand Co., 2970 W. Grand Blvd., Detroit 2, Mich.

CAP SCREWS—See SCREWS (Cap, Set, Safety-Set)

CAPSTANS (Electric, Gasoline, Diesel)

Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

CAR DUMPERS

Alliance Machine Co., The, Alliance, O.
Industrial Brownhoist Corp., Bay City, Mich.
Link-Belt Co., 300 W. Pershing Road, Chicago 9, Ill.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

CAR PULLERS and SPOTTERS

Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.
Link-Belt Co., 2410 W. 18th St., Chicago 8, Ill.
Mahr Mfg. Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.
Vulcan Iron Works, Wilkes-Barre, Pa.

CARBIDE

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
National Carbide Corp., 60 E. 42nd St., New York 17, N. Y.
Shawinigan Products Corp., Empire State Bldg., New York 1, N. Y.

CARBIDE METALS (Special Parts)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Vascoloy-Ramet Corp., N. Chicago, Ill.

CARBIDE TOOLS (Steel Cutting)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Scully-Jones & Co., 1901 S Rockwell St., Chicago 8, Ill.
Vascoloy-Ramet Corp., N. Chicago, Ill.
Ziv Steel & Wire Co., 2945 W. Harrison St., Chicago 12, Ill.

CARBON SPECIALTIES

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

CARBURIZING (Pack or Gas)

Commercial Metals Treating, Inc., 177 S. St. Clair St., Toledo 1, O.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Lakeside Steel Improvement Co., The, 5418 Lakeside Ave., Cleveland 14, O.
U. S. Automatic Corp., Amherst, O.

CARS (Charging)

Atlas Car & Mfg. Co., The, 1180 Ivanhoe Rd., Cleveland 10, O.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Foundry & Machine Co., E. Chicago, Ind.
Morgan Engineering Co., The, Alliance, O.
Pennsylvania Eng. Works, New Castle, Pa.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

CARS (Dump)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Bethlehem Steel Co., Bethlehem, Pa.
Differential Steel Car Co., Findlay, O.
Easton Car & Construction Co., Easton, Pa.
Pressed Steel Car Co. Inc., (Industrial Div.) Grant Bldg., Pittsburgh 19, Pa.

CARS (Hot Metal Transfer)

Bartlett Hayward Div., Koppers Co., Baltimore 3, Md.

CARS (Industrial and Mining)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Differential Steel Car Co., Findlay, O.
Easton Car & Construction Co., Easton, Pa.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Pressed Steel Car Co., Inc., (Industrial Div.) Grant Bldg., Pittsburgh 19, Pa.

CARS (Scale)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.

CASTERS

Rapids Standard Co., Inc., The, Peoples Natl. Bank Bldg., Grand Rapids 2, Mich.

CASTING EQUIPMENT (Precision)

Saunders, Alexander, & Co., 95 Bedford St., New York 14, N. Y.

CASTING MACHINES (Centrifugal)

Saunders, Alexander, & Co., 95 Bedford St., New York 14, N. Y.

CASTING WASHER EQUIPMENT

Pangborn Corporation, Hagerstown, Md.

CASTINGS (Acid Resisting)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Ampco Metal Inc., Dept. S12, Milwaukee 4, Wis.
Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Cadman, A. W., Mfg. Co., 28th & Smallman St., Pittsburgh 22, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
International Nickel Co. Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
McGill Mfg. Co., Inc., Valparaiso, Ind.
Meehanite Research Institute, Pershing Bldg., New Rochelle, N. Y.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Alloy Steel Div. of Blaw-Knox Co., Blawnox, Pa.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Ohio Steel Foundry Co., Lima & Springfield, O.
Shenango-Penn Mold Co., 457 W. Third St., Dover, O.
Solar Precision Castings, Inc., 18th & Grand Sts., Des Moines 5, Ia.

CASTINGS (Alloy Iron)

Bethlehem Steel Co., Bethlehem, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Meehanite Research Institute, Pershing Bldg., New Rochelle, N. Y.
National Alloy Steel Div. of Blaw-Knox Co., Blawnox, Pa
Solar Precision Castings, Inc., 18th & Grand Sts., Des Moines 5, Ia.

CASTINGS (Alloy Steel)

Advance Foundry Co., The, 100 Parnell Ave., Dayton 3, O.
Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Babcock-Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Foundry & Machine Co., E. Chicago, Ind.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Michiana Products Corp., Michigan City, Ind.
National Alloy Steel Div. of Blaw-Knox Co., Blawnox, Pa.
National Erie Corp., Erie, Pa.
Ohio Steel Foundry Co., Lima, and Springfield, O.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Solar Precision Castings, Inc., 18th & Grand Sts., Des Moines 5, Ia.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Union Steel Castings Div. of Blaw-Knox Co., 62nd & Butler Sts., Pittsburgh 1, Pa.
United Engineering & Foundry Co., 1st National Bank Bldg., Pittsburgh 22, Pa.
Solar Precision Castings, Inc., 18th & Grand Sts., Des Moines 5, Ia.

CASTINGS (Aluminum, Brass, Bronze, Copper)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19. Pa.
Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O.
Ampco Metal Inc., Dept. S12, Milwaukee 4, Wis.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Bethlehem Steel Co., Bethlehem, Pa.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Bunting Brass & Bronze Co., The, 715 Spencer St., Toledo 1, O.
Cadman, A. W., Mfg. Co., 28th & Smallman St., Pittsburgh 22, Pa.
Century Foundry Co., 3727 Market St., St. Louis 10, Mo.
Homestead Valve Mfg. Co., P. O. Box 22, Coraopolis, Pa.
Johnson Bronze Co., 550 S. Mill St., New Castle, Pa.
McGill Mfg. Co., Inc., Valparaiso, Ind.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Permold Co., The, 830 W. Liberty St., Medina, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Shenango-Penn Mold Co., 457 W. Third St., Dover, O.
Solar Precision Castings, Inc., 18th & Grand Sts., Des Moines 5, Ia.
Wellman Bronze & Aluminum Co., The, 2539 E. 93 St., Cleveland 4, O.

CASTINGS (Centrifugal)

American Cast Iron Pipe Co., 2030 N. 16th St., Birmingham 2, Ala.
Ampco Metal Inc., Dept. S12, Milwaukee 4, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
McGill Mfg. Co., Inc., Valparaiso, Ind.
Michiana Products Corp., Michigan City, Ind.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Ohio Steel Foundry Co., Lima & Springfield, O.
Shenango-Penn Mold Co., 457 W. Third St., Dover, O.

CASTINGS (Corrosion Resisting)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
American Cast Iron Pipe Co., 2030 N. 16th St., Birmingham 2, Ala.
Bethlehem Steel Co., Bethlehem, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
McGill Mfg. Co., Inc., Valparaiso, Ind.
Meehanite Research Institute, Pershing Bldg., New Rochelle, N. Y.
Michiana Products Corp., Michigan City, Ind.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Alloy Steel Div. of Blaw-Knox Co., Blawnox, Pa.
National Lead Co., 111 Broadway, New York 6, N. Y.
Ohio Steel Foundry Co., Lima & Springfield, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Shenango-Penn Mold Co., 457 W. Third St., Dover, O.
Solar Precision Castings, Inc., 18th & Grand Sts., Des Moines 5, Ia.

CASTINGS (Electric Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Clark Equipment Co., Buchanan, Mich.
Continental Foundry & Machine Co., E. Chicago, Ind.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
National Erie Corp., Erie, Pa.
Ohio Steel Foundry Co., Lima & Springfield, O.
Reading Steel Casting Div. of American Chain & Cable Co., Inc., Reading, Pa.

CASTINGS (Gray Iron, Alloy or Semi-Steel)

Advance Foundry Co., The, 100 Parnell Ave., Dayton 3, O.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Bedford Foundry & Mach. Co., Bedford, Ind.
Bethlehem Steel Co., Bethlehem, Pa
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Century Foundry Co., 3727 Market St., St. Louis 10, Mo.
Columbia Steel Co., San Francisco 6, Calif.
Davenport-Besler Corp., Davenport, Iowa
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Mahr Mfg. Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Meehanite Research Institute, Pershing Bldg., New Rochelle, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Oil Well Supply Co., Dallas 1, Tex
Ottumwa Iron Works, Ottumwa, Ia.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Shenango-Penn Mold Co., 457 W. Third St., Dover, O.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.

CASTINGS (Heat Resisting)

Advance Foundry Co., The, 100 Parnell Ave., Dayton 3, O.
Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
International Nickel Co. Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
Meehanite Research Institute, Pershing Bldg., New Rochelle, N. Y.
Michiana Products Co., Michigan City, Ind.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Alloy Steel Div. of Blaw-Knox Co., Blawnox, Pa.
Ohio Steel Foundry Co., Lima & Springfield, O.
Shenango-Penn Mold Co., 457 W. Third St., Dover, O.
Solar Precision Castings, Inc., 18th & Grand Sts., Des Moines 5, Ia.

CASTINGS (Magnesium)

American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich
Dow Chemical Co., The, Midland, Mich.
Light Metals, Inc., 1100-1198 E. 24th St., Indianapolis 5, Ind.
Wellman Bronze & Aluminum Co. The, 2539 E. 93rd St., Cleveland 4, O.

CASTINGS (Malleable)

American Chain Div. American Chain & Cable Co., Inc., York, Pa.
Lake City Malleable Co., The, 5026 Lakeside Ave., Cleveland 14, O.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Saginaw Malleable Iron Div. General Motors Corp., Saginaw, Mich.

CASTINGS (Permanent-Mold)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19. Pa
Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O.
Permold Co., The, 830 W. Liberty St., Medina, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Stewart-Warner Corp., Stewart Die Casting Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.

CASTINGS (Precision, Lost Wax Process)

Austenal Laboratories, Inc., 5932 S. Wentworth Ave., Chicago 21, Ill.

CASTINGS (Steel) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Cal.
Continental Foundry & Machine Co., E. Chicago, Ind.
*Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
*Lebanon Steel Foundry, Lebanon, Pa.
Mackintosh-Hemphill Co., 9th & Bingham Sts., Pittsburgh 3, Pa.
Mesta Machine Co., P. O. Box 1466 Pittsburgh 30, Pa.
*Michiana Products Co., Michigan City, Ind.
*Midvale Co., The Nicetown, Philadelphia 40, Pa.
National Erie Corp., Erie, Pa.
*Ohio Steel Foundry Co., Lima & Springfield, O.
Oil Well Supply Co., Dallas 1, Tex.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Saginaw Malleable Iron Div. General Motors Corp., Saginaw, Mich.
*Solar Precision Castings, Inc., 18th & Grand Sts., Des Moines 5, Ia.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Steel Founders' Society of America, 920 Midland Bldg., Cleveland 15, O.
Strong Steel Fdry. Co., Hertel & Norris Aves., Buffalo 7, N. Y.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Union Steel Castings Div. of Blaw-Knox Co., 62nd and Butler Sts., Pittsburgh 1, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.

CASTINGS (Wear Resisting)

Bethlehem Steel Co., Bethlehem, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hagan, George J., Co., 2400 E. Carson St., Pittsburgh 3. Pa.
Haynes Stellite Co., aHrrison & Lindsay Sts., Kokomo, Ind.
Jessop Steel Co., 584 Green St., Washington, Pa.
Lebanon Steel Foundry, Lebanon, Pa.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Meehanite Research Institute, Pershing Bldg., New Rochelle, N. Y.
Michiana Products Corp., Michigan City, Ind.
National Alloy Steel Div., Blaw-Knox Co., Blawnox, Pa.
Ohio Steel Foundry Co., Lima & Springfield, O.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Saginaw Malleable Iron Div., General Motors Corp., Saginaw, Mich.
Shenango-Penn Mold Co., 457 W. Third St., Dover, O.
Solar Precision Castings, Inc., 18th & Grand Sts., Des Moines 5, Ia.
Taylor-Wharton Iron & Steel Co., Easton, Pa.

CASTINGS (Worm and Gear Bronze)

Ampco Metal Inc., Dept. S12, Milwaukee 4, Wis.
Cadman, A. W., Mfg. Co., 28th & Smallman Sts., Pittsburgh 22. Pa.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Shenango-Penn Mold Co., 457 W. Third St., Dover, O.

CEMENT (Acid Proof)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa

CEMENT (Elastic)

Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.

CEMENT (High Temperature)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., The, Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Norton Co., Worcester 6, Mass.
Owens-Corning Fiberglass Corp., 1873 Nicholas Bldg., Toledo 1, O.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.

CEMENT (High Temperature Hydraulic)

Atlas Lumnite Cement Co., Dept. S, Chrysler Bldg., New York 17, N. Y.
Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.

CENTRAL STATION EQUIPMENT

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Federal Electric Products Co., 50 Paris St., Newark 5, N. J.
General Electric Co., Schenectady 5, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

CHAIN (Conveyor and Elevator)

Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Cleveland Chain & Mfg. Co., The, Broadway & Henry Rd., Cleveland 5, O.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Union Chain & Mfg. Co., Sandusky, O.

CHAIN (Draw Bench)

Cleveland Chain & Mfg. Co., The, Broadway & Henry Rd., Cleveland 5, O.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Union Chain & Mfg. Co., Sandusky, O.

CHAIN (Malleable)

Cleveland Chain & Mfg. Co., The, Broadway & Henry Rd., Cleveland 5, O.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Lake City Malleable Co., The, 5026 Lakeside Ave., Cleveland 14, O.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.

CHAIN (Power Transmission)

Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Morse Chain Co., Ithaca, N. Y.
Union Chain & Mfg. Co., Sandusky, O.

CHAIN (Roller)

Atlantic Gear Works, 200 Lafayette St., New York 12, N. Y.
Industrial Gear Mfg. Co., 4545 W. Van Buren St., Chicago 24, Ill.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Morse Chain Co., Ithaca, N. Y.
Union Chain & Mfg. Co., Sandusky, O.

CHAIN (Silent)

Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Morse Chain Co., Ithaca, N. Y.
Union Chain & Mfg. Co., Sandusky, O.

CHAIN (Sling)

American Chain Div., American Chain & Cable Co., Inc., York, Pa.
Cleveland Chain & Mfg. Co., The, Broadway & Henry Rd., Cleveland 5, O.
Columbus-McKinnon Chain Corp., 118 Fremont Ave., Tonawanda, N. Y.

CHAIN (Welded & Weldless)

American Chain Div., American Chain & Cable Co. Inc., York, Pa.
Cleveland Chain & Mfg. Co., The, Broadway & Henry Rd., Cleveland 5, O.
Columbus-McKinnon Chain Corp., 118 Fremont Ave., Tonawanda, N. Y.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.

CHANNELS—See BEAMS, CHANNELS, ANGLES

CHARGING BOXES

Pittsburgh Steel Foundry Corp., Glassport, Pa.
Union Steel Castings Div. of Blaw-Knox Co., 62nd & Butler Sts., Pittsburgh 1, Pa.

CHARGING MACHINES (Cupola)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Morgan Engineering Co., The, Alliance, O.

CHARGING MACHINES (Open Hearth)

Brosius, Edgar E., Co., Sharpsburg P. O., Pittsburgh 15, Pa.
Morgan Engineering Co., The, Alliance, O.

CHECKER BRICK

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.

CHECKS (Metal)

Cunningham, M. E., Co., 172 E. Carson St., Pittsburgh 19, Pa.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

CHEMICAL PROCESSING EQUIPMENT

Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
Struthers Wells Corp., Titusville, Pa.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

CHEMICALS (Industrial)

American Chemical Paint Co., Ambler, Pa.
duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
General Chemical Co., 40 Rector St., New York 6, N. Y.
Hercules Powder Co., Inc., Wilmington 99, Del.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.
Wilkens-Anderson Co., 111 No. Canal St., Chicago 6, Ill.

CHEMICALS (Laboratory)

Baker & Adamson Div. General Chemical Co., 40 Rector St., New York 6, N. Y.
Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.

CHILLING EQUIPMENT (Metal)

Deepfreeze, Div. of Motor Products Corp., 2309-7 Davis St., N. Chicago, Ill.

CHROME MORTAR

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Harbison-Walker Refractories Co. 1800 Farmers Bank Bldg. Pittsburgh 22, Pa.

CHROME ORE

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

CHROMIUM METAL AND ALLOYS

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Metal Hydrides, Inc., 12-24 Congress St., Beverly, Mass.
Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

CHROMIUM PLATING (Hard)

Acme Plating Co., The, 1563 E. 21st St., Cleveland 14, O.

CHROMIUM PLATING PROCESSES AND EQUIPMENT

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
United Chromium, Inc., 51 E. 42nd St., New York 17, N. Y.

CHUCK OPERATING CYLINDERS

Anker-Holth Mfg. Co., 2723 Connors St., Port Huron, Mich.

CHUCKING MACHINES (Multiple Spindle)

Bullard Co., The, Bridgeport 2, Conn.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
New Britain Machine Co., New Britain, Conn.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O

CHUCKS

Bullard Co., The, Bridgeport 2, Conn.
Lee, K. O., Company, Aberdeen, S. Dak.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

CHUCKS (Automatic Closing)

Anker-Holth Mfg. Co., 2723 Connors St., Port Huron, Mich.

CHUCKS (Quick Change)

Titan Tool Co., Fairview, Pa.

CLAMPS, CABLE (Sheet Metal)

Tinnerman Products, Inc., 2039 Fulton Rd., Cleveland 13, O.

CLAMPS (Drop Forged)

Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

CLAMPS (Pipe Repair)

Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.

CLAMPS (Plate Lifting)

Merrill Brothers, 56-04 Arnold Ave. Maspeth, N. Y.

CLAMPS (Toggle)

Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.

CLARIFIERS (Coolant)

Honan-Crane Corp., 210 S. Wabash Ave., Lebanon, Ind.

CLEANERS (Oil and Grease Absorbent)

Waverly Petroleum Products Co., Drexel Bldg., Philadelphia 6, Pa

CLEANERS (Steam)

Detrex Corp., 13029 Hillview Ave., Detroit 4, Mich.
Homestead Valve Mfg. Co., P. O. Box 22, Corsopolis, Pa.
Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co., Dept. S, Pennsalt Cleaner Div., Philadelphia 7, Pa.

CLEANERS AND FILTERS (Air)

Adams, R. P., Co., Inc., 75 Chicago St., Buffalo 4, N. Y.
American Air Filter Co., Inc., 443 Central Ave., Louisville 8, Ky.
Bellows Co., The, 869 Tallmadge Ave., Akron 10, O.
Moraine Products Div., General Motors Corp., Dayton 1, O.
Owens-Corning Fiberglass Corp., 1873 Nicholas Bldg., Toledo 1, O.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Westinghouse Electric Corp., 1216 W. 58th St., Cleveland 1, O.

CLEANING EQUIPMENT (Metal)

American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Bullard Co., The, Bridgeport 2, Conn.
Detrex Corporation, 13029 Hillview Ave., Detroit 4, Mich.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Federal Foundry Supply Co., The, 4600 E. 71st St., Cleveland 5, O.
Gray-Mills Co., 1948-52 Ridge Ave., Evanston, Ill.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Pangborn Corporation, Hagerstown, Md.
Ransohoff, N., Inc., 1317 Township Ave., Cincinnati 16, O.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Wean Engineering Co., Inc., The, Warren, O.

CLEANING SPECIALTIES

American Chemical Paint Co., Ambler, Pa.
Detrex Corporation, 13029 Hillview Ave., Detroit 4, Mich.
duPont de Nemours, E. I. & Co., Inc., Wilmington 98, Del.
Oakite Products Inc., 30H Thames St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co., Dept. S. Pennsalt Cleaner Div., Philadelphia 7, Pa.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.

CLUTCH DISCS

Twin Disc Clutch Co., 1379 Racine Ave., Racine, Wis.

CLUTCH FACINGS

Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

CLUTCHES (Free Wheeling)

Morse Chain Co., Ithaca, N. Y.

CLUTCHES (Friction)

Dodge Manufacturing Corp., Mishawaka, Ind.
Jones, W. A., Fdry. & Mach. Co., 4437 Roosevelt Rd., Chicago 24, Ill.
Link-Belt Co., 300 W. Pershing Road, Chicago 9, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Morse Chain Co., Ithaca, N. Y.
Twin Disc Clutch Co., 1379 Racine Ave., Racine, Wis.

CLUTCHES (Magnetic)

Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.

COAL OR COKE

Alan Wood Steel Co., Conshohocken, Pa.
Cleveland-Cliffs Iron Co., The, Union Commerce Bldg., Cleveland 14, O.
Hanna Furnace Corp., The, Penobscot Bldg., Detroit 26, Mich.
Koppers Co., Gas & Coke Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Koppers Coal Div., Eastern Gas & Fuel Assoc., 300 Koppers Bldg., Pittsburgh 19, Pa.
National Foundry Sand Co., 2970 W. Grand Blvd., Detroit 2, Mich.
New England Coal & Coke Co., Boston 16, Mass.
Pickands Mather & Co., Union Commerce Bldg., Cleveland 14, O.
Shenango Furnace Co., Oliver Bldg., Pittsburgh 22, Pa.
Snyder, W. P., & Co., Oliver Bldg., Pittsburgh 22, Pa.

COAL, COKE, ORE, ASH HANDLING AND PROCESSING MACHINERY

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Bethlehem Steel Co., Bethlehem, Pa.
Easton Car & Construction Co., Easton, Pa.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.

COAL, COKE, ORE, ASH HANDLING AND PROCESSING MACHINERY (Con.)

Industrial Brownhoist Corp., Bay City, Mich.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Koppers Co., Engineering & Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Thew Shovel Co., The, Lorain, O.
Vulcan Iron Works, Wilkes-Barre, Pa.

COILERS (Strip & Wire)

Lewis Fdry & Mach. Div. of Blaw-Knox Co., Pittsburgh 30, Pa.

COILS (Direct Expansion)

General Electric Company (Air Conditioning & Commercial Refrigeration Div. Sec. 4412), Bloomfield, N. J.
Westinghouse Electric Corp., 653 Page Blvd., Springfield 2, Mass.

COILS (Electrical)

Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.

COILS (Water or Steam)

General Electric Company (Air Conditioning & Commercial Refrigeration Div. Sec. 4412), Bloomfield, N. J.
Westinghouse Electric Corp., 653 Page Blvd., Springfield 2, Mass.

COKE—See COAL or COKE

COKE OVEN MACHINERY

Alliance Machine Co., The Alliance, O.
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Koppers Co., Engineering & Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Morgan Engineering Co., The, Alliance, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

COKE OVEN (By-Product)

Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

COLLET CHUCKS

Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Universal Engineering Co., Frankenmuth, Mich.

COLLETS

Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

COLUMBIUM

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Metal Hydrides, Inc., 12-24 Congress St., Beverly, Mass.

COMBUSTION BOATS

Carborundum Co., The, Niagara Falls, N. Y.
Norton Company, Worcester 6, Mass.

COMBUSTION CONTROLS

Bristol Co., The, Waterbury 91, Conn.
Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.
Morgan Construction Co., Worcester 5, Mass.

COMPARATORS (Optical)

Jones & Lamson Machine Co., Springfield, Vt.

COMPENSATORS (Automatic)

Cutler-Hammer, Inc., 1310 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
General Electric Co., Schenectady 5, N. Y.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Westinghouse Electric Corp., Dept. 7N, E. Pittsburgh, Pa.

COMPOUNDS (Case Hardening, Heat Treating)

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

COMPOUNDS (Copper, Metal Finishing, Rust Removing, Rust Preventing)

American Chemical Paint Co., Ambler, Pa.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.
Oakite Products Inc., 30H Thames St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.
Rheem Research Products, Inc., 206 Standard Oil Bldg., Baltimore 2, Md.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.

COMPOUNDS (Drawing & Stamping)

Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Oakite Products Inc., 30H Thames St., New York 6, N. Y.

COMPOUNDS (Floor Cleaning)

Detrex Corp., 13029 Hillview Ave., Detroit 4, Mich.
Oakite Products Inc., 30H Thames St. New York 6, N. Y.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.

COMPRESSORS (Air)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Curtis Pneumatic Machinery Div. of Curtis Mfg. Co., 1996 Kienlen Ave., St. Louis 20, Mo.
DeLaval Steam Turbine Co., Trenton 8, N. J.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Jaeger Machine Co., The, 550 W. Spring St., Columbus 15, O.
Sturtevant, B. F. Co., Hyde Park, Boston 36, Mass.

CONCRETE (Heat Resistant)

Atlas Lumnite Cement Co., Dept. S, Chrysler Bldg., New York, 17, N. Y.
Babcock & Wilcox Refractories Co., 85 Liberty St., New York, 6, N. Y.

CONCRETE REINFORCING BARS —See BARS (Concrete Reinforcing)

CONDENSERS (Evaporative)

Niagara Blower Co., Dept. S-105, 6 E. 45th St., New York 17, N. Y.

CONDENSERS (Surface, Barometric, Multi-Jet)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
General Electric Company (Air Conditioning & Commercial Refrigeration Div. Sec. 4412), Bloomfield, N. J.
Harrisburg Steel Corp., Harrisburg, Pa.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Ross Heater & Mfg. Co., Inc., 1431 West Ave., Buffalo 13, N. Y.
Westinghouse Electric Corp., 653 Page Blvd., Springfield 2, Mass.

CONDUITS (Asbestos Cement)

Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

CONDUITS (Electric)

Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.
General Electric Co., Schenectady 5, N. Y.
Steel and Tubes Div., Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

CONDUITS (Wood)

Koppers Co., Wood Preserving Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

CONNECTING RODS

Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.

CONTACTS & CONTACTORS (Electric)

Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1310 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Federal Electric Products Co., 50 Paris St., Newark 5, N. J.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.
Ward Leonard Electric Company, 65 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

CONTAINERS (Shipping)

Rathborne, Hair & Ridgway Co., 1440 W. 21st Place, Chicago 8, Ill.

CONTRACT WORK

Allied Products Corp., 4646 Lawton St., Detroit 8, Mich.
Amon-Schulte Co., 321 Ohio River Blvd., Emsworth, Pittsburgh 2, Pa.
Atlas Metal Stamping Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Bridgewater Screw Products Co., Bridgewater, Mass.
Commercial Metals Treating Inc., 177 S. St. Clair St., Toledo 1, O.
Covert Mfg. Co., Heyman Machine Div., Troy, N. Y.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Gerding Bros., 5 E. Third St., Cincinnati 2, O.
Johnston & Jennings Co., The 877 Addison Rd., Cleveland 14, O.
Joyce Machine Co., Hatboro, Pa.
Nilson, A. H., Machine Co., The, 1525 Railroad St., Bridgeport 5, Conn.
Ohio Tool Co., 3160 W. 160th St., Cleveland 11, O.
Orange Screen Co., Maplewood, N. J.
Steel Products Engineering Co., The 1205 W. Columbia St., Springfield, O.
Warren City Mfg. Co., Warren, O.

CONTRACTORS—See ENGINEERS AND CONTRACTORS

CONTROL ASSEMBLIES (Remote Valve)

Zurn, J. A., Mfg. Co., Erie, Pa.

CONTROL EQUIPMENT (Electric)

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bristol Co., The, Waterbury 91, Conn.
Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1310 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Federal Electric Products Co., 50 Paris St., Newark 5, N. J.
General Electric Co., Schenectady 5, N. Y.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

CONTROL SYSTEMS (Automatic)

Bristol Co., The, Waterbury 91, Conn.
Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.
New York Air Brake Co., The, 420 Lexington Ave., New York 17, N. Y.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

CONTROL SYSTEMS (Office, Tool, Production, Materials)

Remington-Rand Inc., Systems Div., 415 Fourth Ave., New York 10, N. Y.

CONTROLS (Combustion)—See COMBUSTION CONTROLS

CONTROLS (Temperature)

Bristol Co., The, Waterbury 91, Conn.
Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

CONVEYING SYSTEMS (Steam Jet)

Hagan, George J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.

CONVEYOR BELTS

Manheim Mfg. & Belting Co. Manheim, Pa.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

CONVEYOR BELTS (High & Low Temperature)

Cyclone Fence Div., American Steel & Wire Co., Waukegan, Ill.
Steel Parts Mfg. Corp. Div. of Blackstone Mfg. Co., 226 S. Morgan St., Chicago 7, Ill.
Wickwire Spencer Steel, Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

CONVEYOR BELTS (Wire)

Cyclone Fence Div., American Steel & Wire Co., Waukegan, Ill.
Wickwire Spencer Steel, Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

CONVEYORS (Apron)

Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Mathews Conveyer Co., Ellwood City, Pa.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Union Chain & Mfg. Co., Sandusky, O.

CONVEYORS (Belt)

Bartlett, C. O. & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Mathews Conveyer Co., Ellwood City, Pa.
Rapids Standard Co., Inc., The, Peoples Natl. Bank Bldg., Grand Rapids 2, Mich.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Steel Parts Mfg. Corp. Div. of Blackstone Mfg. Co., 226 S. Morgan St., Chicago 7, Ill.

CONVEYORS (Chain)

Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.

CONVEYORS (Chain) (Con.)

Mathews Conveyer Co., Ellwood City, Pa.
Union Chain & Mfg. Co., Sandusky, O.
Vulcan Iron Works, Wilkes-Barre, Pa.

CONVEYORS (Drag)

Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Mathews Conveyer Co., Ellwood City, Pa.

CONVEYORS (Elevating)

Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Link-Belt Co., 300 W. Pershing Rd. Chicago 9, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Mathews Conveyer Co., Ellwood City, Pa.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.

CONVEYORS (Overhead)

Link-Belt Co., 2410 W. 18th St., Chicago 8, Ill.
Mathews Conveyer Co., Ellwood City, Pa.

CONVEYORS (Overhead Trolley)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Link-Belt Co., 2410 W. 18th St., Chicago 8, Ill.
Mathews Conveyer Co., Ellwood City, Pa.
Reading Chain & Block Corp., 2102 Adams St., Reading Pa.

CONVEYORS (Pneumatic)

Mellon, R. C., Co., The, 8650 Mt Elliott Ave., Detroit 11, Mich.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.

CONVEYORS (Portable)

Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Mathews Conveyer Co., Ellwood City, Pa.
Rapids Standard Co., Inc., The, Peoples Natl. Bank Bldg., Grand Rapids 2, Mich.

CONVEYORS (Roller—Power and Gravity)

Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.

CONVEYORS (Slat)

Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Mathews Conveyer Co., Ellwood City, Pa.
Union Chain & Mfg. Co., Sandusky, O.

CONVEYORS (Vibrating)

Ajax Flexible Coupling Co., 4 English St., Westfield, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Vulcan Iron Works, Wilkes-Barre, Pa.

CONVEYORS (Wheel—Gravity)

Rapids Standard Co., Inc., The Peoples Natl. Bank Bldg., Grand Rapids 2, Mich.

COOLANT SYSTEMS (Portable)

Gray-Mills Co., 1948-52 Ridge Ave., Evanston, Ill.

COOLERS (Liquid, Compressed Air, Gas)

Niagara Blower Co., Dept. S-105 6 E. 45th St., New York 17, N. Y.
Ross Heater & Mfg. Co., Inc., 1431 West Ave., Buffalo 13, N. Y.

COPPER—See METALS (Nonferrous)

COPPER (Phosphorized)

American Brass Co., The, Waterbury 88, Conn.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Revere Copper & Brass, Inc. 230 Park Ave., New York 17, N.Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

CORE WASH

Federal Foundry Supply Co., The, 4600 E. 71st St., Cleveland 5, O.

COTTER PINS

American Chain Div., American Chain & Cable Co., Inc., York, Pa
Hindley Mfg. Co., Valley Falls, R. I.
Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
Manufacturers Screw Products, 216 W. Hubbard St. Chicago 10, Ill.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.

COUNTERBORES

Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
Masterform Tool Co., 2532 Irving Park Blvd., Chicago 18, Ill.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

COUNTING DEVICES

Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Veeder-Root, Inc., Hartford 2, Conn.

COUPLINGS (Chain)

Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Morse Chain Co., Ithaca, N. Y.
Union Chain & Mfg. Co., Sandusky, O.

COUPLINGS (Flexible)

Ajax Flexible Coupling Co., 4 English St., Westfield, N. Y.
American Flexible Coupling Div., J. A. Zurn Mfg. Co., 18th St. & Pittsburgh Ave., Erie, Pa.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
General Electric Co., Schenectady 5, N. Y.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
James, D. O., Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Lovejoy Flexible Coupling Co., 4973 W. Lake St., Chicago 44, Ill.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Morse Chain Co., Ithaca, N. Y.
Philadelphia Gear Works, Erie Ave. & G St., Philadelphia 34, Pa.
Poole Fdy. & Mach. Co., Woodberry, Baltimore 11, Md.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Union Chain & Mfg. Co., Sandusky, O.
Waldron, John, Corp., New Brunswick, N. J.
Westinghouse Electric Corp., 200 McCandless Ave., Pittsburgh 1, Pa.

COUPLINGS (Hose)

Cleveland Pneumatic Tool Co., The, 3781 E. 77th St., Cleveland 5, O.
Goodrich, B. F., Co., The, Akron 18, O.
Hansen Manufacturing Co., The, 1786 E. 27th St., Cleveland 14, O.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y
Kelly Machinery Co., 2524 W. Madison St., Chicago 12, Ill.

COUPLINGS (Pipe)

Bethlehem Steel Co., Bethlehem, Pa.
Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.
Harrisburg Steel Corp., Harrisburg, Pa.
National Tube Co. Frick Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept 8T, Cleveland 4, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

CRADLES (Coil)

Littell, F. J., Machine Co., 4165 N. Ravenswood Ave., Chicago 13, Ill.

CRANES (Charging)

Alliance Machine Co., The Alliance, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Morgan Engineering Co., The, Alliance, O.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

CRANES (Gantry)

Alliance Machine Co., The Alliance, O.
American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Bedford Foundry & Mach. Co., Bedford, Ind.
Browning, Victor R., Co., Inc., Willoughby, O.
Cleveland Crane & Engineering Co., The, 1125 E. 283rd St., Wickliffe, O.
Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.
Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Morgan Engineering Co., The, Alliance, O.
Northwest Engineering Co., 28 E. Jackson Blvd., Chicago 4, Ill.
Ohio Locomotive Crane Co., Bucyrus, O.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago 5, Ill.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.
Thew Shovel Co., The, Lorain, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

CRANES (Hand)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Bedford Foundry & Mach. Co., Bedford, Ind.
Chicago Tramrail Co., 2912 W. Carroll Ave., Chicago 12, Ill.
Chisholm-Moore Hoist Corp., 118 Fremont Ave., Tonawanda, N. Y.
Cleveland Crane & Engineering Co., The, 1125 E. 283rd St., Wickliffe, O.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Curtiss Pneumatic Machinery Div. of Curtiss Mfg. Co., 1996 Kienlen Ave., St. Louis 20, Mo.
Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.
Industrial Brownhoist Corp., Bay City, Mich.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.
Wright Mfg. Div. of American Chain & Cable Co., Inc., York, Pa.

CRANES (Jib)

Alliance Machine Co., The Alliance, O.
American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Bedford Foundry & Mach. Co., Bedford, Ind.
Chicago Tramrail Co., 2912 W. Carroll Ave., Chicago 12, Ill.
Chisholm-Moore Hoist Corp., 118 Fremont Ave., Tonawanda, N. Y.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Link-Belt Speeder Corp., 301 W. Pershing Rd., Chicago 9, Ill.
Morgan Engineering Co., The, Alliance, O.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Thew Shovel Co., The Lorain, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.
Wright Mfg. Div. of American Chain & Cable Co., Inc., York, Pa.

CRANES (Locomotive)

Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Northwest Engineering Co., 28 E. Jackson Blvd., Chicago 4, Ill.
Ohio Locomotive Crane Co., Bucyrus, O.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago 5, Ill.
Osgood Co., The, Marion, O.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y

CRANES (Monorail)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Chicago Tramrail Co., 2912 W. Carroll Ave., Chicago 12, Ill.
Chisholm-Moore Hoist Corp., 118 Fremont Ave., Tonawanda, N. Y.
Cleveland Crane & Engineering Co., The, 1125 E. 283rd St., Wickliffe, O.
Euclid Crane & Hoist Co., The 1365 Chardon Rd., Euclid, O.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

CRANES (Self-propelled)

Baker-Raulang Co., The, 2167 W. 25th St., Cleveland 13, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Hughes-Keenan Co., 585 Newman St., Mansfield, O.
Industrial Brownhoist Corp., Bay City, Mich.
Link-Belt Speeder Corp., 301 W. Pershing Rd., Chicago 9, Ill.
Northwest Engineering Co., 28 E. Jackson Blvd., Chicago 4, Ill.
Ohio Locomotive Crane Co., Bucyrus, O.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago 5, Ill.
Osgood Co., The, Marion, O
Thew Shovel Co., The, Lorain, O.

CRANES (Traveling)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Bedford Foundry & Mach. Co., Bedford, Ind.
Chicago Tramrail Co., 2912 W. Carroll Ave., Chicago 12, Ill.
Chisholm-Moore Hoist Corp., 118 Fremont Ave., Tonawanda, N. Y.
Erie Steel Construction Co., 961 Geist Rd., Erie, Pa.
Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago 5, Ill.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Wright Mfg. Div. of American Chain & Cable Co., Inc., York, Pa.

CRANES, BRIDGE (Ore and Coal Handling)

Alliance Machine Co., The Alliance, O.
Browning, Victor R., Co., Inc., Willoughby, O.
Industrial Brownhoist Corp., Bay City, Mich.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

CRANKSHAFTS

Bay City Forge Co., W. 19th and Cranberry Sts., Erie, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Canton Drop Forging & Mfg. Co., The, Canton, O.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Ladish Drop Forge Co., Cudahy, Wis.

CRANKSHAFTS

Midvale Co., The
Nicetown, Philadelphia 40, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Ohio Crankshaft Co., The, 3800 Harvard Ave., Cleveland 1, O.
Union Drawn Steel Div., Republic Steel Corp., Massillon, O.

CRAYONS (Metal Marking)

American Crayon Co., Sandusky, O.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

CRUSHERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Pulverizer Co., 1539 Macklind Ave., St. Louis 10, Mo
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Gruendler Crusher & Pulverizer Co., 2915-17 N. Market St., St. Louis 6, Mo.
Jeffrey Mfg. Co., The, 889-99 N Fourth St., Columbus 16, O.
Mahr Mfg. Co., Div of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago 5, Ill.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Vulcan Iron Works, Wilkes-Barre, Pa.

CUSHIONS (Pneumatic)

Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.

CUTTERS (Bar and Bar Products)

Bok m Tool Co., 14775 Wildermere Ave., Detroit 21, Mich.
Porter, H. K., Inc., 401 Ashland St., Everett, Mass.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.

CUTTERS (Die Sinking & End Milling)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Tomkins-Johnson Co., The, Dept. S, 611 N. Mechanic St., Jackson, Mich.

CUTTERS (Gear Shaper)

Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.

CUTTERS (Herringbone Gear)

Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.

CUTTERS (Keyseating)

Davis Keyseater Co., 399 Exchange St., Rochester 8, N. Y.

CUTTERS (Thread Milling)

Barber-Colman Co., 150 Loomis St., Rockford, Ill.
Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.

CUTTERS (Wire and Cable)

Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Porter, H. K., Inc., 401 Ashland St., Everett, Mass.

CUTTING AND WELDING—See WELDING

CUTTING OILS—See OILS (Cutting)

CUTTING-OFF MACHINES (Abrasive)

Campbell, Andrew C., Div., American Chain & Cable Co., Inc., Bridgeport 2, Conn.
Landis Machine Co., Waynesboro, Pa.

CUTTING-OFF MACHINES (Rotary)

Consolidated Machine Tool Corp. 565 Blossom Rd., Rochester 10, N. Y.
Pines Engineering Co., 215 S. Highland, Aurora, Ill.
Pratt-Roop Co., Louisville, Ky.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

CYANIDING

Commercial Metals Treating, Inc. 177 S. St. Clair St., Toledo 1, O
Lakeside Steel Improvement Co., The, 5418 Lakeside Ave., Cleveland 14, O.
Pittsburgh Commercial Heat Treating Co., 49th St., & A.V.R.R., Pittsburgh 1, Pa.
U. S. Automatic Corp., Amherst, O.

CYLINDERS (Air or Hydraulic)

Anker-Holth Mfg. Co., 2723 Connors St., Port Huron, Mich.
Bellows Co., The, 869 Tallmadge Ave., Akron 10, O.
Curtis Pneumatic Machinery Div. of Curtis Mfg. Co., 1996 Kienlen Ave., St. Louis 20, Mo.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Galland-Henning Mfg. Co., 2747 S. 31st St., Milwaukee 7, Wis.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Scaife Co., Ann St., Oakmont, Pa.
Tomkins-Johnson Co., The, Dept. S, 611 N. Mechanic St., Jackson, Mich.
Weatherhead Co., The, 300 E. 131st St., Cleveland 8, O

CYLINDERS (Pressure)

Bethlehem Steel Co., Bethlehem, Pa.
Harrisburg Steel Corp., Harrisburg, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Scaife Co., Ann St., Oakmont, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.

DEGREASERS

American Chemical Paint Co., Ambler, Pa.
Detrex Corporation, 13029 Hillview Ave., Detroit 4, Mich.
Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co. Dept. S, Pennsalt Cleaner Div., Philadelphia 7, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.

DEODORANT (Plant Sanitation)

Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.

DEOXIDIZERS

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

DERRICKS (Steel Stiffleg, Barge or Guy)

Bedford Foundry & Machine Co., Bedford, Ind.

DESCALING PROCESSES AND EQUIPMENT

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
American Chemical Paint Co., Ambler, Pa.
American Foundry Equipment Co. 509 S. Byrkit St., Mishawaka, Ind.
Bullard Co., The, Bridgeport 2, Conn.
duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.

DESIGNERS (Product)

Atlas Tool & Designing Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.

DIAMOND WHEELS

Norton Co., Worcester 6, Mass.

DIE BLOCKS

Advance Foundry Co., The, 100 Parnell Ave., Dayton 3, O.
American Shear Knife Co., P.O. Box 355, Homestead, Pa
Ampco Metal Inc., Dept. S12, Milwaukee 4, Wis.
Bissett Steel Co., The, 945 E. 67th St., Cleveland 3, O.
Finkl, A., & Sons Co., 2011 N. Southport Ave., Chicago 14, Ill.
Firth-Sterling Steel Company, McKeesport, Pa.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
Holliday, W. J., & Co., Hammond, Ind.
Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Jessop Steel Co., 584 Green St., Washington, Pa.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.

DIE CASTINGS (Aluminum, Magnesium, Zinc)

Advance Pressure Castings Inc., 42 N. 15th St., Brooklyn 22, N. Y.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Stewart-Warner Corp., Stewart Die Casting Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.

DIE CENTERS

Firth-Sterling Steel Company, McKeesport, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Vascoloy-Ramet Corp., N. Chicago, Ill.

DIE HEADS

Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Jones & Lamson Machine Co., Springfield, Vt.
Landis Machine Co., Waynesboro, Pa.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.

DIE SETS

Advance Foundry Co., The, 100 Parnell Ave., Dayton 3, O.
Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.

DIE-SINKING MACHINES

Cincinnati Milling Machine Co., Cincinnati 9, O.

DIES (Forging)—See FORGING DIES

DIES (Notching)

Allied Products Corp., 4646 Lawton St., Detroit 8, Mich.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.

DIES (Perforating)

Allied Products Corp., 4646 Lawton St., Detroit 8, Mich.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.

DIES (Punching, Stamping, Blanking)

Ace Mfg. Corp., 1211 East Erie Ave., Philadelphia 24, Pa.
Advance Foundry Co., The, 100 Parnell Ave., Dayton 3, O.
Allied Products Corp., 4646 Lawton St., Detroit 8, Mich.
Covert Mfg. Co., Heyman Machine Div., Troy, N. Y.
Firth-Sterling Steel Company, McKeesport, Pa.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Poulsen & Nardon, Inc., 2665 Leonis Blvd., Los Angeles 11, Cal.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
Vascoloy-Ramet Corp., N. Chicago, Ill.
Verson Allsteel Press Co., 1355 E. 93rd St., Chicago 19, Ill.
Zeh & Hahnemann Co., 56 Avenue A, Newark 5, N. J.

DIES (Steel, Embossing)

Cunningham, M. E., Co., 172 E. Carson St., Pittsburgh 19, Pa.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.
Sossner Co., 161 Grand St., New York 13, N. Y.

DIES (Trimming)

Allied Products Corp., 4646 Lawton St., Detroit 8, Mich.
Bliss, E. W., Co., 53rd & First Ave., Brooklyn 32, N. Y.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Poulsen & Nardon, Inc., 2665 Leonis Blvd., Los Angeles 11, Cal.
Steel Products Engineering Co., The, 1205 W. Columbia St., Springfield, O.

DIES AND CHASERS (Threading)

Landis Machine Co., Waynesboro, Pa.

DIFFERENTIALS

Fairfield Manufacturing Co., 808 S. Earl Ave., Lafayette, Ind.

DIPPERS (Rubber)

Goodrich, B. F., Co., The, Akron 18, O.

DIPPING MACHINES (Monorail)

American MonoRail Co., The, 13102 Athens Ave., Cleveland, O.
Cleveland Crane & Engineering Co., The, 1125 E. 283rd St., Wickliffe, O.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

DISCS (Abrasive)

Abrasive Products Inc., 511 Pearl St., S. Braintree, Mass.
Carborundum Co., The, Niagara Falls, N. Y.
Chicago Wheel & Manufacturing Co. Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd. Chicago 6, Ill.
Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.
Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.
Norton Co., Worcester 6, Mass.

DOLOMITE—FLUX AND REFRACTORIES

Baker, The J. E., Co., 114 N. George St., York, Pa.
Basic Refractories, Inc., Hanna Bldg., Cleveland 15, O.

DOORS & SHUTTERS (Steel, Wood Rolling—Service, Fire)

Kinnear Mfg. Co., The, 1780-1800 Fields Ave., Columbus 16, O.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.

DOWEL PINS (Steel)

Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.

DRAFT GAGES (Indicating, Recording)

Bristol Co., The, Waterbury 91, Conn.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.

DRAGLINES (Crawler)

Northwest Engineering Co., 28 E. Jackson Blvd., Chicago 4, Ill.
Thew Shovel Co., The, Lorain, O.

DRAINS (Roof, Floor & Area)

Zurn, J. A., Mfg. Co., Erie, Pa.

DRAW BENCHES

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Bigwood, Joshua, & Son Ltd., Wolverhampton, England.
McKay Machine Co., The, 546 W. Rayen St., Youngstown 2, O.
Vaughn Machinery Co., Cuyahoga Falls, O.

DRESSERS (Grinding Wheel)

Carborundum Co., The, Niagara Falls, N. Y.
Chicago Wheel & Manufacturing Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Lee, K. O., Company, Aberdeen, S. Dak.
Safety Grinding Wheel & Machine Co., P. O. Box 746, Springfield, O.

DRILL HEADS

Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.

DRILL RODS—See RODS (Drill)

DRILLING MACHINERY

Baker Bros., Inc., Post & Westlake Sts., Toledo 10, O.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Cincinnati Bickford Tool Co., 3220 Forrer Ave., Cincinnati 9, O.
Cross Co., The 3250 Bellevue Ave., Detroit 7, Mich.
Guibert Steel Co., P. O. Box 1837, Pittsburgh, Pa.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.

DRILLING MACHINES (Horizontal)

General Engineering & Mfg. Co., 1523 S. 10th St., St. Louis 4, Mo.
National Automatic Tool Co., S. 7th & N Sts., Richmond, Ind.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.

DRILLING MACHINES (Radial)

Cincinnati Bickford Tool Co., 3220 Forrer Ave., Cincinnati 9, O.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.

DRILLING MACHINES (Vertical)

Baker Bros., Inc., Post & Westlake Sts., Toledo 10, O.
Bryant Machinery & Engineering Co., 400 W. Madison St., Chicago 6, Ill.
Cincinnati Bickford Tool Co., 3220 Forrer Ave., Cincinnati 9, O.
Cleereman Machine Tool Co., Green Bay, Wis.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Haskins, R. G., Co., 615 S. California Ave., Chicago 12, Ill.
Moline Tool Co., 102 20th St., Moline, Ill.
National Automatic Tool Co., S. 7th & N Sts., Richmond, Ind.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.

DRILLS (Electric Portable)

Chicago Wheel & Manufacturing Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.
Mid-States Equipment Co., Welding Div., 2425 S. Michigan Ave., Chicago 16, Ill.

DRILLS (Pneumatic)

Cleveland Pneumatic Tool Co., The, 3781 E. 77th St., Cleveland 5, O.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

DRILLS (Twist)—See TWIST DRILLS

DRIVES (Chain)

Atlantic Gear Works, 200 Lafayette St., New York 12, N. Y.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.
Union Chain & Mfg. Co., Sandusky, O.

DRIVES (Cut Herringbone Gear)

Atlantic Gear Works, 200 Lafayette St., New York 12, N. Y.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
James, D. O., Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Link-Belt Co., 2045 W. Hunting Park Ave., Philadelphia 40, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Philadelphia Gear Works, Erie Ave. & G Sts., Philadelphia 34, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Westinghouse Electric Corp., 200 McCandless Ave., Pittsburgh 1, Pa.

DRIVES (Hydraulic)

Twin Disc Clutch Co., 1379 Racine Ave., Racine, Wis.

DRIVES (Multi-V-Belt)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Dodge Manufacturing Corp., Mishawaka, Ind.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.

DRUMS (Steel)

Rheem Research Products, Inc., 206 Standard Oil Bldg., Baltimore 2, Md.
Wheeling Steel Corp., Wheeling, W. Va.

DRY CLEANING EQUIPMENT

Detrex Corporation, 13029 Hillview Ave., Detroit 4, Mich.

DRYERS (Compressed Air)

Ruemelin Mfg. Co., 3882 N. Palmer St., Milwaukee 12, Wis.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.

DRYERS (Paint, Varnish, Enamel, Chemical)

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Fostoria Pressed Steel Corp., The, Fostoria, O.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Maehler, Paul, Co., The, 2208 W. Lake St., Chicago 12, Ill.
Mahon, The R. C., Co., 8650 Mt. Elliott Ave., Detroit 11, Mich.
Struthers Wells Corp., Titusville, Pa

DRYERS AND COOLERS (Rotary)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bartlett, C. O., & Snow Co., The 6200 Harvard Ave., Cleveland 5, O.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Vulcan Iron Works, Wilkes-Barre, Pa.

DUCTS (Acid Fume, Rubber Lined)

Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

DUPLICATING EQUIPMENT

American Photocopy Equipment Co., 2849 N. Clark St., Chicago 14, Ill.
Ozalid Products Div., General Analine & Film Corp., Johnson City, N. Y.

DUST ARRESTING EQUIPMENT

American Air Filter Co., Inc., 443 Central Ave., Louisville 8, Ky.
American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Owens-Corning Fiberglass Corp., 1873 Nicholas Bldg., Toledo 1, O.
Pangborn Corporation, Hagerstown, Md.
Ruemelin Mfg. Co., 3882 N. Palmer St., Milwaukee 12, Wis.
Schneible, Claude B., Co., 2827 25th St., Detroit 16, Mich.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Westinghouse Electric Corp., 1216 W. 58th St., Cleveland 1, O.

ECONOMIZERS

Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.

ELECTRICAL EQUIPMENT

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.
Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Electric Eye Equipment Co., 11 W Fairchild St., Danville, Ill.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Federal Electric Products Co., 50 Paris St., Newark 5, N. J.
Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
Fostoria Pressed Steel Corp., The, Fostoria, O.
General Electric Co., Schenectady 5, N. Y.
Master Electric Co., The, 100 Davis Ave., Dayton 1, O.
Square D Co., 6060 Rivard St., Detroit 11, Mich.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

ELECTRODE HOLDERS (Welding)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Hobart Bros., Co., The, Box St. 16, Troy, O.
Lincoln Electric Co., The, Cleveland 1, O.
Tweco Products Co., 1018 E. English St., Wichita 7, Kan.

ELECTRODES (Alloy) (*Also Stainless)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
*Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
*Alloy Rods Co., York, Pa.
American Agile Corp., 5800 Hough Ave., Cleveland 3, O.
Arcos Corp., 1515 Locust St., Philadelphia 2, Pa.
*Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y.
*General Electric Co., Schenectady 5, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Lincoln Electric Co., The, Cleveland 1, O.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

ELECTRODES (Carbon and Graphite)

International Graphite & Electrode Corp., St. Marys, Pa.
National Carbon Co., Inc., Electrode Sales Div., 30 E. 42nd St., New York 17, N. Y.

ELECTRODES (Hard Surfacing Welding)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
American Agile Corp., 5800 Hough Ave., Cleveland 3, O.
Arcos Corp., 1515 Locust St., Philadelphia 2, Pa.
General Electric Co., Schenectady 5, N. Y.
Lee, K. O., Company, Aberdeen, S. Dak.
Lincoln Electric Co., The, Cleveland 1, O.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

ELECTRODES (Resistance Welding)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

ELECTRONIC CONTROL

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cook Electric Co., 2700 N. Southport Ave., Chicago 14, Ill.
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
General Electric Co., Schenectady 5, N. Y.
Westinghouse Electric Corp., Dept. 7 N.-E. Pittsburgh, Pa.

ELEVATING AND CONVEYING MACHINERY—See CONVEYORS

ENGINEERS (Consulting)

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Associated Engineers, Inc., 230 E. Berry St., Fort Wayne 2, Ind.
Atlas Tool & Designing Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Easton Car & Construction Co., Easton, Pa.
Garrett, George K., Co., Inc., 1421 Chestnut St., Philadelphia 2, Pa.
Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.
Rheem Research Products, Inc., 206 Standard Oil Bldg., Baltimore 2, Md.
Trundle Engineering Co., The, 1501 Euclid Ave., Cleveland 15, O
Warren City Mfg. Co., Warren, O.

ENGINEERS (Management)

Associated Engineers, Inc., 230 E. Berry St., Fort Wayne 2, Ind.
Trundle Engineering Co., The, 1501 Euclid Ave., Cleveland 15, O.

ENGINEERS AND CONTRACTORS

Associated Engineers, Inc., 230 E. Berry St., Fort Wayne 2, Ind.
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Morgan Engineering Co., The, Alliance, O.
Poulsen & Nardon, Inc., 2665 Leonis Blvd., Los Angeles 11, Cal.
Warren City Mfg. Co., Warren, O.
Wean Engineering Co. Inc., The, Warren, O.

ENGINES (Diesel)

Cooper-Bessemer Corp., The, Mt. Vernon, O.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

ENGINES (Gas, Oil)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Ingersoll-Rand Co., 11 Broadway New York 4, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Wisconsin Motor Corp., Milwaukee 14, Wis.

ENGINES (Kerosene)

Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.

ENGINES (Steam)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Oil Well Supply Co., Dallas 1, Tex.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Vulcan Iron Works, Wilkes-Barre, Pa.

EVAPORATORS

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Struthers Wells Corp., Titusville, Pa

EXCAVATORS

Northwest Engineering Co., 28 E. Jackson Blvd., Chicago 4, Ill.
Osgood Co., The, Marion, O.
Thew Shovel Co., The, Lorain, O.

EXHAUST HEADS

Burt Mfg. Company, The, 400 S. High St., Akron 11, O.

EXHAUST SYSTEMS (Pickling Tank)

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.

FABRICATING (Metal)

Brasco Mfg. Co., Harvey, Ill.
Covert Mfg. Co., Heyman Machine Div., Troy, N. Y.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Mahon, R. C., Co., The 8650 Mt. Elliott Ave., Detroit 11, Mich.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.
Orange Screen Co., Maplewood, N. J.
Poulsen & Nardon, Inc., 2665 Leonis Blvd., Los Angeles 11, Cal.
Warren City Mfg. Co., Warren, O.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

FABRICATORS (Structural)

Bedford Foundry & Mach. Co., Bedford, Ind.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.
Duffin Iron Company, 37 W. Van Buren St., Chicago 5, Ill.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Guibert Steel Co., P. O. Box 1837, Pittsburgh, Pa.
Ingalls Iron Works Co., The, Birmingham 2, Ala.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Warren City Mfg. Co., Warren, O.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

FACE SHIELDS

Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

FANS (Crane Cab)

Perkins, B. F., & Son, Inc., Holyoke, Mass.

FANS (Exhaust Ventilating)

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
General Electric Co., Bridgeport 2, Conn.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.

FANS (Mechanical Draft)

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.

FANS (Portable)

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Perkins, B. F., & Son, Inc., Holyoke, Mass.

FANS (Wall)

Perkins, B. F., & Son, Inc., Holyoke, Mass.

FASTENERS (Locked In)

Huck Mfg. Co., 2480 Bellevue Ave., Detroit 7, Mich.

FEEDERS (Rotary)

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.

FEEDS (Roll, Dial, Magazine)

Bliss, E. W., Co., 53rd St. & First Ave., Brooklyn 32, N. Y.
Littell, F. J., Machine Co., 4165 N. Ravenswood Ave., Chicago 13, Ill.

FENCE (Chain Link)

Continental Steel Corp., Kokomo, Ind.
Cyclone Fence Div., American Steel & Wire Co., Waukegan, Ill.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Page Steel & Wire Div. American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.

FENCE POSTS (Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.

FENCING (Wire)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco 6, Cal.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
Page Steel & Wire Div. American Chain & Cable Co., Inc., Monessen, Pa.
Republic Steel Corp., Dept. ST., Cleveland 4, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.

FERROALLOY BRIQUETS

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Ohio Ferro Alloys Corp., Citizens Bldg., Canton 2, O.

FERROALLOYS

Cleveland-Cliffs Iron Co., The, Union Commerce Bldg., Cleveland 14, O.
Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Keokuk Electro-Metals Co., Keokuk, Ia.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Miller & Co., 332 S. Michigan Ave., Chicago 4, Ill.
Ohio Ferro Alloys Corp., Citizens Bldg., Canton 2, O.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

FERROBORON

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Molybdenum Corp. of America, Grant Bldg., Pittsburgh 19, Pa.

FERROCHROME

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Ohio Ferro Alloys Corp., Citizens Bldg., Canton 2, O.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.
Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

FERROCOLUMBIUM

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.

FERROMANGANESE

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Ohio Ferro Alloys Corp., Citizens Bldg., Canton 2, O.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

FERROMOLYBDENUM

Climax Molybdenum Co., 500 Fifth Ave., New York 18, N. Y.
Molybdenum Corp. of America, Grant Bldg., Pittsburgh 19, Pa.

FERROPHOSPHORUS

Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

FERROSILICON

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Keokuk Electro-Metals Co., Keokuk, Ia.
Miller & Co., 332 S. Michigan Ave., Chicago 4, Ill.
Ohio Ferro Alloys Corp., Citizens Bldg., Canton 2, O.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.
Southern Ferro Alloys Co., 2108 Chestnut St., Chattanooga 2, Tenn.
Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.
Westinghouse Electric Corp., Dept. 7N, E. Pittsburgh, Pa.

FERROSILICON ALUMINUM

Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

FERROTITANIUM

Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

FERROTUNGSTEN

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Molybdenum Corp. of America, Grant Bldg., Pittsburgh 19, Pa.

FERROVANADIUM

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

FILES AND RASPS

Disston, Henry, & Sons, Inc., 1126 Tacony, Philadelphia 35, Pa.
Haskins, R. G., Co., 615 S. California Ave., Chicago 12, Ill.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.

FILES (Band-Metal)

DoAll Co., The, 231 N. Laurel Ave., Des Plaines, Ill.

FILTER MEDIA

Moraine Products Div., General Motors Corp., Dayton 1, O.

FILTERS (Air)—See CLEANERS AND FILTERS (Air)

FILTERS (Acid)

Adams, R. P., Co., Inc., 75 Chicago St., Buffalo 4, N. Y.

FILTERS (Air-Engine)

American Air Filter Co., Inc., 448 Central Ave., Louisville 8, Ky.
Donaldson Co. Inc., 666 Pelham St., St. Paul 4, Minn.

FILTERS (Coolant)

Honan-Crane Corp., 210 S. Wabash Ave., Lebanon, Ind.

FILTERS (Oil)

Burt Mfg. Company, The, 400 S. High St., Akron 11, O.
Honan-Crane Corp., 210 S. Wabash Ave., Lebanon, Ind.

FINISH, BLACK OXIDE (Chemicals for)

Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.

FINISHING EQUIPMENT (Painting, and Drying)

Fostoria Pressed Steel Corp., The, Fostoria, O.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.

FIRE BRICK—See BRICK

FIRE BRICK (Insulating)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

FIRE CLAY —See REFRACTORIES

FIRE DOORS & SHUTTERS—See DOORS & SHUTTERS

FIRE EXTINGUISHERS

Cardox Corp., Bell Bldg., Chicago 1, Ill.
Kidde, Walter, & Co., Inc., 254 Main St., Belleville 9, N. J.

FIRE EXTINGUISHING SYSTEMS

Cardox Corp., Bell Bldg., Chicago 1, Ill.
Kidde, Walter, & Co., Inc., 254 Main St., Belleville 9, N. J.

FITTINGS (Acid Proof)

Goodrich, B. F., Co., The, Akron 18, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

FITTINGS (Drainage)

Zurn, J. A., Mfg. Co., Erie, Pa.

FITTINGS (Pipe Welding)

Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.

FLAME HARDENING

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Black Mfg. Co., 1416-1428 W. Baltimore St., Baltimore 23, Md.

FLAME HARDENING (Con.)

Commercial Metals Treating, Inc., 177 S. St. Clair St., Toledo 1, O.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
Lakeside Steel Improvement Co., The, 5418 Lakeside Ave., Cleveland 14, O.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.
National Erie Corp., Erie, Pa.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

FLANGES (Cast Steel)

Commercial Metals Treating, Inc., 177 S. St. Clair St., Toledo 1, O.
Pittsburgh Steel Foundry Corp., Glassport, Pa.

FLANGES (Deep Drawn)

Legion Utensils Corp., 40th Ave. & 21st St., Long Island City 1, N. Y.

FLANGES (Forged Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Commercial Metals Treating, Inc., 177 S. St. Clair St., Toledo 1, O.
Harrisburg Steel Corp., Harrisburg, Pa.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Ladish Drop Forge Co., Cudahy, Wis.
Phoenix Manufacturing Co., Catasauqua, Pa.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.

FLANGES (Welded Steel)

Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
King Fifth Wheel Co., 2915 N. Second St., Philadelphia 33, Pa.

FLEXIBLE SHAFT MACHINERY

Haskins, R. G., Co., 615 S. California Ave., Chicago 12, Ill.
Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.

FLOORING (Monolithic)

Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

FLOORING (Steel)

Alan Wood Steel Co., Conshohocken, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tri-Lok Co., 3515 Butler St., Pittsburgh 1, Pa.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.

FLUE DUST CONDITIONERS

Brosius, Edgar E. Co., Sharpsburg P. O., Pittsburgh 15, Pa.

FLUE GAS ANALYZERS

Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.

FLUORSPAR

Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa

FLUXES (Brazing)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

FLUXES (Soldering, Welding & Tinning)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Chemical Paint Co., Ambler, Pa.
American Solder & Flux Co., 2153 E. Norris St., Philadelphia 25, Pa.
Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
Kester Solder Co., 4222 Wrightwood Ave., Chicago 39, Ill.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

FOIL (Electrical Condenser)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

FORGING DIES

Finkl, A., & Sons Co., 2011 N. Southport Ave., Chicago 14, Ill.
Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Phoenix Manufacturing Co., Catasauqua, Pa.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.

FORGING MACHINERY

Alliance Machine Co., The, Alliance, O.
Baldwin Southwark Div., Baldwin Locomotive Works, Paschall P. O., Philadelphia 42, Pa.
Erie Foundry Co., Erie, Pa.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Industrial Brownhoist Corp., Bay City, Mich.
Morgan Engineering Co., The, Alliance, O.
National Machinery Co., The, Tiffin, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Verson Allsteel Press Co., 1355 E. 93rd St., Chicago 19, Ill.

FORGINGS (Aluminum, Magnesium, Brass, Bronze, Copper)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Brass Co., The, Waterbury 88, Conn.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Ampco Metal Inc., Dept. S12, Milwaukee 4, Wis.
Bison Forge Co., 119 Manitoba St., Buffalo 6, N. Y.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Canton Drop Forging & Mfg. Co., The, Canton 2, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.
Wyman-Gordon Products Corp., Worcester, Mass.

FORGINGS (Drop) (*Also Stainless)

*Aircraft Mechanics, Inc., Nevada St., Colorado Springs, Colo.
*Atlas Drop Forge Co., Lansing 2, Mich.
*Bethlehem Steel Co., Bethlehem, Pa
Caine Steel Co., Drop Forge Div., 426 Weakley St., Memphis 10, Tenn.
*Canton Drop Forging & Mfg. Co., The, Canton 2, O.
Davenport-Besler Corp., Davenport, Iowa.
Frost Gear and Forge Div., Clark Equipment Co., Jackson, Mich.
Harrisburg Steel Corp., Harrisburg, Pa.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Ladish Drop Forge Co., Cudahy, Wis.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Phoenix Manufacturing Co., Catasauqua, Pa.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.
Wyman-Gordon Products Corp., Worcester, Mass.

FORGINGS (Hollow Bored)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Atlas Drop Forge Co., Lansing 2, Mich.
Bay City Forge Co., W. 19th and Cranberry Sts., Erie, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Canton Drop Forging & Mfg. Co., The, Canton 2, O.
Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.
Finkl, A., & Sons Co., 2011 N. Southport Ave., Chicago 14, Ill.
Harrisburg Steel Corp., Harrisburg, Pa.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Phoenix Manufacturing Co., Catasauqua, Pa.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Wyman-Gordon Products Corp., Worcester, Mass.

FORGINGS (Iron and Steel) (*Also Stainless)

*Aircraft Mechanics, Inc., Nevada St., Colorado Springs, Colo.
*Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
*Atlas Drop Forge Co., Lansing 2, Mich.
Bay City Forge Co., W. 19th and Cranberry Sts., Erie, Pa.
*Bethlehem Steel Co., Bethlehem, Pa.
Bison Forge Co., 119 Manitoba St., Buffalo 6, N. Y.
*Canton Drop Forging & Mfg. Co., The, Canton 2, O.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Dresser Manufacturing, Div. Dresser Industries, Bradford, Pa.
Finkl, A., & Sons Co., 2011 N. Southport Ave., Chicago 14, Ill.
Frost Gear and Forge Div., Clark Equipment Co., Jackson, Mich.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
*Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
*Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Ladish Drop Forge Co., Cudahy, Wis.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
*Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Oil Well Supply Co., Dallas 1, Tex.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Phoenix Manufacturing Co., Catasauqua, Pa.
SKF Steels, Inc., 420 Lexington Ave., New York 17, N. Y.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Struthers Wells Corp., Titusville, Pa.
*Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.
Wyman-Gordon Products Corp., Worcester, Mass.

FORGINGS (Machined)

Aircraft Mechanics, Inc., Nevada St., Colorado Springs, Colo.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Dresser Manufacturing, Div. Dresser Industries, Bradford, Pa.
Finkl, A., & Sons Co., 2011 N. Southport Ave., Chicago 14, Ill.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.

FORGINGS (Press)

Bethlehem Steel Co., Bethlehem, Pa.
Canton Drop Forging & Mfg. Co., The, Canton 2, O.
Dresser Manufacturing, Div. Dresser Industries, Bradford, Pa.
Ladish Drop Forge Co., Cudahy, Wis.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.

FORGINGS (Small)

Aircraft Mechanics, Inc., Nevada St., Colorado Springs, Colo.
Dresser Manufacturing, Div. Dresser Industries, Bradford, Pa.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Phoenix Manufacturing Co., Catasauqua, Pa.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.
Young & Ward Inc., Fair & Elm Sts., Hillsboro, O.

FORGINGS (Upset)

American Metal Products Co., 5959 Linsdale Ave., Detroit 4, Mich.
Atlas Drop Forge Co., Lansing 2, Mich.
Bethlehem Steel Co., Bethlehem, Pa.
Canton Drop Forging & Mfg. Co., The, Canton 2, O.
Dresser Manufacturing, Div. Dresser Industries, Bradford, Pa.
Frost Gear and Forge Div., Clark Equipment Co., Jackson, Mich.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Ladish Drop Forge Co., Cudahy, Wis.
Milton Mfg. Co., The, Milton, Pa.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Phoenix Manufacturing Co., Catasauqua, Pa.
SKF Steels, Inc., 420 Lexington Ave., New York 17, N. Y.
Standard Tube Co., The, 14600 Woodward Ave., Detroit 3, Mich.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.
Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.
Wyman-Gordon Products Corp., Worcester, Mass.

FOUNDRY EQUIPMENT

Ajax Flexible Coupling Co., 4 English St., Westfield, N. Y.
American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Federal Foundry Supply Co., The, 4600 E. 71st St., Cleveland 5, O.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N. Minneapolis 11, Minn.

FOUNDRY EQUIPMENT (Con.)

Pangborn Corporation, Hagerstown, Md.
Ransohoff, N., Inc., 1317 Township Ave., Cincinnati 16, O.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Warren City Mfg. Co., Warren, O.

FRAMES (Automobile)

Parish Pressed Steel Co., Reading, Pa.

FRAMES (Motor Truck, Trailer & Bus)

Parish Pressed Steel Co., Reading, Pa.

FROGS AND SWITCHES

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

FUEL OIL ADDITIVE

Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.

FURNACE EQUIPMENT (Water Cooled)

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.

FURNACE INSULATION—See INSULATION

FURNACES (Brazing)

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Electric Furnace Co., The, 440 W Wilson St., Salem, O.
Firth-Sterling Steel Co., McKeesport, Pa.
General Electric Co., Schenectady 5, N. Y.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Harper Electric Furnace Corp., 1470 Buffalo Ave., Niagara Falls, N. Y.
Hevi Duty Electric Co., 4212 W. Highland Blvd., Milwaukee 1, Wis.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y. 23 N.Y.
Lindberg Engineering Co., 2466 N. Hubbard St., Chicago 12, Ill.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

FURNACES (Controlled Atmosphere)

Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Harper Electric Furnace Corp., 1470 Buffalo Ave., Niagara Falls, N. Y.
Holcroft & Co., 6545 Epworth Blvd., Detroit 10, Mich.
Lindberg Engineering Co., 2466 N. Hubbard St., Chicago 12, Ill.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

FURNACES (Electric Heating)

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
General Electric Co., Schenectady 5, N. Y.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Hevi Duty Electric Co., 4212 W. Highland Blvd., Milwaukee 1, Wis.
Holcroft & Co., 6545 Epworth Blvd., Detroit 10, Mich.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y. 23, N.Y.
Lindberg Engineering Co., 2466 N. Hubbard St., Chicago 12, Ill.
Mahr Mfg Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1257, Pittsburgh 30, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

FURNACES (Electric Melting)

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Detroit Electric Furnace Div., Kuhlman Electric Co., Bay City, Mich.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y. 23, N.Y.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1257, Pittsburgh 30, Pa.
Saunders, Alexander, & Co., 95 Bedford St., New York 14, N. Y.
Swindell-Dressler Corp., P. O. Box 1888, Pittsburgh 30, Pa.

FURNACES (Enameling)

Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
General Electric Co., Schenectady 5, N. Y.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Maehler, Paul, Co., The, 2208 W. Lake St., Chicago 12, Ill.

FURNACES (Forging)

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Amsler-Morton Co., The, Div. of Union Mining Co., Fulton Bldg., Pittsburgh 22, Pa.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Holcroft & Co., 6545 Epworth Blvd., Detroit 10, Mich.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Lansing Engineering Co., 934-36 Clark St., Lansing 6, Mich.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y. 23, N.Y.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Pennsylvania Industrial Engineers, Div. of Union Mining Co., 2413 W. Magnolia St., Pittsburgh 12, Pa.
R-S Products Corp., 122 Berkley St., Philadelphia 44, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Swindell-Dressler Corp., P. O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.
Wilson, Lee, Engineering Co., Inc., 20005 Lake Rd., Cleveland 16, O.

FURNACES (Galvanizing)

General Electric Co., Schenectady 5, N. Y.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Pennsylvania Industrial Engineers, Div. of Union Mining Co., 2413 W. Magnolia St., Pittsburgh 12, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

FURNACES (Gas Fired & Induction)

Saunders, Alexander, & Co., 95 Bedford St., New York 14, N. Y.

FURNACES (Gas or Oil)

Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Electric Furnace Co., The, 440 W Wilson St., Salem, O.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Holcroft & Co., 6545 Epworth Blvd Detroit 10, Mich.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Johnson Gas Appliance Co., 573 "E" Ave., N. W., Cedar Rapids, Iowa.
Lansing Engineering Co., 934-36 Clark St., Lansing 6, Mich.
Lindberg Engineering Co., 2466 N. Hubbard St., Chicago 12, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
R-S Products Corp., 122 Berkley St., Philadelphia 44, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Swindell-Dressler Corp., P. O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

FURNACES (Heat Treating, Annealing, Carburizing, Hardening, Tempering)

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Amsler-Morton Co., The, Div. of Union Mining Co., Fulton Bldg., Pittsburgh 22, Pa.
Despatch Oven Co., 619 Eighth St., S E., Minneapolis 14, Minn.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
General Electric Co., Schenectady 5, N. Y.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Hevi Duty Electric Co., 4212 W. Highland Blvd., Milwaukee 1, Wis
Holcroft & Co., 6545 Epworth Blvd., Detroit 10, Mich.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Johnson Gas Appliance Co., 573 "E" Ave., N. W., Cedar Rapids, Iowa.
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore 2, Md.
Lansing Engineering Co., 934-36 Clark St., Lansing 6, Mich.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y. 23, N.Y.
Lindberg Engineering Co., 2466 N. Hubbard St., Chicago 12, Ill.
Maehler, Paul, Co., The, 2208 W. Lake St., Chicago 12, Ill.
Pennsylvania Industrial Engineers, Div. of Union Mining Co., 2413 W. Magnolia St., Pittsburgh 12, Pa.
R-S Products Corp., 122 Berkley St., Philadelphia 44, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Swindell-Dressler Corp., P. O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Wean Engineering Co., Inc., The, Warren, O.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.
Wilson, Lee, Engineering Co., Inc., 20005 Lake Rd., Cleveland 16, O.

FURNACES (Induction Melting)

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Saunders, Alexander, & Co., 95 Bedford St., New York 14, N. Y.

FURNACES (Laboratory)

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Hevi Duty Electric Co., 4212 W. Highland Blvd., Milwaukee 1, Wis.
Johnson Gas Appliance Co., 573 "E" Ave., N. W., Cedar Rapids, Iowa.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y. 23, N.Y.
Lindberg Engineering Co., 2466 N. Hubbard St., Chicago 12, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Saunders, Alexander, & Co., 95 Bedford St., New York 14, N. Y.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

FURNACES (Nonferrous Melting)

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Detroit Electric Furnace Div., Kuhlman Electric Co., Bay City, Mich.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y. 23, N.Y.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Saunders, Alexander, & Co., 95 Bedford St., New York 14, N. Y.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

FURNACES (Open Hearth)

Amsler-Morton Co., The, Div. of Union Mining Co., Fulton Bldg., Pittsburgh 22, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.
Pennsylvania Eng. Works, New Castle, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Swindell-Dressler Corp., P. O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

FURNACES (Portable)

Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

FURNACES (Recuperative)

Amsler-Morton Co., The, Div. of Union Mining Co., Fulton Bldg., Pittsburgh 22, Pa.
Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Industrial Oven Engineering Co., 11621 Detroit Ave., Cleveland 2, O.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Swindell-Dressler Corp., P. O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

FURNACES (Rivet Heating)

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., N.Y. 23, N.Y.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

FURNACES (Sheet and Tin Mill)

Amsler-Morton Co., The, Div. of Union Mining Co., Fulton Bldg., Pittsburgh 22, Pa.
Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore 2, Md.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Swindell-Dressler Corp., P. O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Wean Engineering Co., Inc., The, Warren, O.
Wilson, Lee, Engineering Co., Inc., 20005 Lake Rd., Cleveland 16, O.

FURNACES (Sintering)

Harper Electric Furnace Corp., 1470 Buffalo Ave., Niagara Falls, N. Y.

FURNACES (Steel Mill)

Amsler-Morton Co., The, Div. of Union Mining Co., Fulton Bldg., Pittsburgh 22, Pa.
Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore 2, Md.
Pennsylvania Industrial Engineers, Div. of Union Mining Co., 2413 W. Magnolia St., Pittsburgh 12, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Swindell-Dressler Corp., P. O. Box 1888, Pittsburgh 30, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Wean Engineering Co., Inc., The, Warren, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.
Wilson, Lee, Engineering Co., Inc., 20005 Lake Rd., Cleveland 16, O.

FURNACES (Welding)

Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Hagan, Geo. J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.

FURNITURE (Shop)

New Britain Machine Co., New Britain, Conn.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.

GAGE BLOCKS

DoAll Company, The, 231 N. Laurel Ave., Des Plaines, Ill.
Webber Gage Co., 12900 Triskett Rd., Cleveland 11, O.

GAGES

Ace Mfg. Co., 1211 E. Erie Ave., Philadelphia 24, Pa.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Firth-Sterling Steel Co., McKeesport, Pa.
Greenfield Tap & Die Corp., Greenfield, Mass.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Merz Engineering Co., Indianapolis 7, Ind.
Stewart-Warner Corp., Instrument Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.
Trico Products Corp., Buffalo 3, N. Y.
Woodworth, N. A., Co., 1300 E. Nine Mile Rd., Detroit 20, Mich.

GAGES (Automatic Control & Recording)

Bristol Co., The, Waterbury 91, Conn.
Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.

GAGES (Hard Faced)

Merz Engineering Co., Indianapolis 7, Ind.
Woodworth, N. A., Co., 1300 E. Nine Mile Rd., Detroit 20, Mich.

GAGES (Indicating and Recording)

Bristol Co., The, Waterbury 91, Conn.
Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
General Electric Co., Schenectady 5, N. Y.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.
Westinghouse Electric Corp., Orange Ave., Newark 1, N. J.

GAGES (Pressure & Vacuum Recording)

Bristol Co., The, Waterbury 91, Conn.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.

GAGES (Thread-Ring & Plug)

Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Electric Eye Equipment Co., 11 W Fairchild St., Danville, Ill.
Merz Engineering Co., Indianapolis 7, Ind.

GALVANIZING (Hot Dip)

Acme Galvanizing, Inc., Milwaukee 7, Wis.
Acme Steel & Malleable Iron Works, Buffalo, N. Y.
American Hot Dip Galvanizers Assoc., Inc., 1st National Bank Bldg., Pittsburgh 22, Pa.
American Tinning & Galvanizing Co., Erie, Pa.
Atlantic Stamping Co., Rochester, N. Y.
Atlantic Steel Co., Atlanta, Ga.
Atlas Galvanizing Inc., Los Angeles, Calif.
Cattie, Jos. P., & Bros., Gaul and Letterly Sts., Philadelphia 25, Pa.
Columbian Steel Tank Co., Kansas City 7, Mo.
Commercial Metals Treating, Inc., 177 S. St. Clair St., Toledo 1, O.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Emsco Derrick & Equipment Co., Los Angeles 54, Calif.
Enterprise Galvanizing Co., Almond & E. Firth Sts., Philadelphia 25, Pa.
Equipment Steel Products Div. of Union Asbestos and Rubber Co., Blue Island, Ill.
Fanner Mfg. Co., The, Cleveland, O.
Finn, John, Metal Works, San Francisco 7, Cal.
Galvanizers Incorporated, Portland, Ore.
Gregory, Thomas, Galvanizing Works, Maspeth, N. Y.
Hanlon-Gregory Galvanizing Co., 5515 Butler St., Pittsburgh 1, Pa.
Hill, James, Mfg. Co., Providence, R. I.
Hubbard & Co., Oakland, Calif.
Independent Galvanizing Co., Newark, N. J.
International Derrick & Equipment Co., Torrance, Calif.
International-Stacey Corp., Columbus 8, O.
Isaacson Iron Works, Seattle 14, Wash.
Joslyn Co. of California, Los Angeles, Calif.
Joslyn Mfg. & Supply Co., Chicago 9, Ill.
Koven, L. O., & Bro., Inc., Jersey City, N. J.
Laughlin, Thomas, Co., Portland, Maine.
Lehigh Structural Steel Co., Allentown, Pa.
Lewis Bolt & Nut Co., Minneapolis, Minn.
Los Angeles Galvanizing Co., Huntington Park, Calif.
Missouri Rolling Mill Corp., St. Louis 10, Mo.
National Telephone Supply Co., The, Cleveland 3, O.
Newark Galvanizing Co., The, Newark, O.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Penn Galvanizing Co., Philadelphia, Pa.
Rheem Mfg. Co., Richmond, Calif.
Rheem Research Products Inc., 206 Standard Oil Bldg., Baltimore 2, Md.
Riverside Foundry & Galvanizing Co., Kalamazoo, Mich.
San Francisco Galvanizing Works, San Francisco, Calif.
Scaife Co., Ann St., Oakmont, Pa.
Southern Galvanizing Co., Baltimore 30, Md.
Standard Galvanizing Co., Chicago 18, Ill.
Superior Pacific Galvanizing Co., Los Angeles, Calif.
Western Galvanizing Co., Los Angeles 23, Calif.
Wilcox Crittenden & Co., Inc., Middletown, Conn.
Witt Cornice Co., The, Cincinnati 14, O.

GALVANIZING EQUIPMENT (Electro)

Hanson-Van Winkle-Munning Co., Matawan, N. J.

GALVANIZING PLANTS FOR SHEETS

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Erie Foundry Co., Erie, Pa.
Wean Engineering Co., Inc., The, Warren, O.

GALVANIZING POWDER

American Solder & Flux Co., 2153 E. Norris St., Philadelphia 25, Pa.

GALVANIZING PRODUCTS

Commercial Metals Treating, Inc., 177 S. St. Clair St., Toledo 1, O.
Enterprise Galvanizing Co., Almond & E. Firth Sts., Philadelphia 25, Pa.

GAS HOLDERS

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Bethlehem Steel Co., Bethlehem, Pa.

GAS MASKS

Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

GAS PRODUCER PLANTS

Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Morgan Construction Co., Worcester 5, Mass.
Wood, R. D., 400 Chestnut St., Philadelphia 5, Pa.

GAS RECOVERY COKE OVENS AND GAS PLANTS

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

GAS SCRUBBERS AND WASHERS

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.

GASKETS (Asbestos, Metal or Rubber)

Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
National Lead Co., 111 Broadway, New York 6, N. Y.
Steel Improvement & Forge Co., The, 942 E. 64th St., Cleveland 14, O.

GATES (Iron & Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.

GEAR BLANKS

Ampco Metal Inc., Dept. S12, Milwaukee 4, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Cleveland Welding Co., The, W. 117th St. & Berea Rd., Cleveland 7, O.
Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.
Finkl, A., & Sons Co., 2011 N. Southport Ave., Chicago 14, Ill.
Frost Gear and Forge Div., Clark Equipment Co., Jackson, Mich.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
King Fifth Wheel Co., 2915 N. Second St., Philadelphia 33, Pa.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
Ladish Drop Forge Co., Cudahy, Wis.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
National Erie Corp., Erie, Pa.
Ottumwa Iron Works, Ottumwa, Ia.
Philadelphia Gear Works, Erie Ave. & G St., Philadelphia 34, Pa.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Shenango-Penn Mold Co., 457 W. Third St., Dover, O.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Union Steel Castings Div., Blaw-Knox Co., 62nd & Butler Sts., Pittsburgh 1, Pa.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.
U. S. Automatic Corp., Amherst, O.
Waldron, John, Corp., New Brunswick, N. J.

GEAR MACHINERY (Generating)

Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich.

GEAR MACHINERY (Lapping, Finishing, Checking)

Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Master Mfg. Co., Hutchinson, Kans.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.

GEARS (Nonmetallic)

Atlantic Gear Works, 200 Lafayette St., New York 12, N. Y.
Chicago Rawhide Mfg. Co., 1308 Elston Ave., Chicago 22, Ill.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Foote, Brad, Gear Works, 1309 S. Cicero Ave., Cicero 50, Ill.
General Electric Co., Schenectady 5, N. Y.
Illinois Gear & Machine Co., 2108 N. Natchez Ave., Chicago 35, Ill.
Industrial Gear Mfg. Co., 4545 W. Van Buren St., Chicago 24, Ill.
James, D. O., Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Pittsburgh Gear & Machine Co., 2680-2700 Smallman St., Pittsburgh 22, Pa.
Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

GEARS (Steel Laminated)

Illinois Gear & Machine Co., 2108 N. Natchez Ave., Chicago 35, Ill.
Industrial Gear Mfg. Co., 4545 W. Van Buren St., Chicago 24, Ill.
Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.
Waldron, John, Corp., New Brunswick, N. J.

GEARS (Worm)

Atlantic Gear Works, 200 Lafayette St., New York 12, N. Y.
Cleveland Worm & Gear Co., The, 3270 E. 80th St., Cleveland 4, O.
DeLaval Steam Turbine Co., Trenton 8, N. J.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Fairfield Manufacturing Co., 303 S. Earle Ave., Lafayette, Ind.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
Illinois Gear & Machine Co., 2108 N. Natchez Ave., Chicago 35, Ill.
Industrial Gear Mfg. Co., 4545 W. Van Buren St., Chicago 24, Ill.
James, D. O., Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Philadelphia Gear Works, Erie Ave. & G St., Philadelphia 34, Pa.
Pittsburgh Gear & Machine Co., 2680-2700 Smallman St., Pittsburgh 22, Pa.
Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.
Steel Products Engineering Co., The, 1205 W. Columbia St., Springfield, O.

GEARS AND GEAR CUTTING

Atlantic Gear Works, 200 Lafayette St., New York 12, N. Y.
Barber-Colman Co., 150 Loomis St., Rockford, Ill.
Cleveland Worm & Gear Co., The, 3270 E. 80th St., Cleveland 4, O.
DeLaval Steam Turbine Co., Trenton 8, N. J.
Dodge Manufacturing Corp., Mishawaka, Ind.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Fairfield Manufacturing Co., 303 S. Earl Ave., Lafayette, Ind.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Foote, Brad, Gear Works, 1309 S. Cicero Ave., Cicero 50, Ill.
Frost Gear and Forge Div. Clark Equipment Co., Jackson, Mich.
General Electric Co., Schenectady 5, N. Y.
Grant Gear Works, 2nd & B Sts., Boston 27, Mass.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
Illinois Gear & Machine Co., 2108 N. Natchez Ave., Chicago 35, Ill.
Industrial Gear Mfg. Co., 4545 W. Van Buren St., Chicago 24, Ill.
James, D. O., Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Jones, W. A., Fdry. & Mach. Co., 4437 Roosevelt Rd., Chicago 24, Ill.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Moraine Products Div., General Motors Corp., Dayton 1, O.
National Erie Corp., Erie, Pa.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, Ohio
Ottumwa Iron Works, Ottumwa, Ia.
Philadelphia Gear Works, Erie Ave. & G St., Philadelphia 34, Pa.
Pittsburgh Gear & Machine Co., 2680-2700 Smallman St., Pittsburgh 22, Pa.
Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.
Steel Products Engineering Co., The, 1205 W. Columbia St., Springfield, O.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Warren City Mfg. Co., Warren, O.
Westinghouse Electric Corp., 200 McCandless Ave., Pittsburgh 1, Pa.

GENERATING SETS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Century Electric Co., 1806 Pine St., St. Louis 3, Mo.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
DeLaval Steam Turbine Co., Trenton 8, N. J.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
General Electric Co., Schenectady 5, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Master Electric Co., The, 100 Davis Ave., Dayton 1, O.
Ready-Power Co., The, 3842 Grand River Ave., Detroit 8, Mich.
Reliance Electric & Eng. Co., 1088 Ivanhoe Rd., Cleveland 10, O.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

GENERATORS (Acetylene—Portable and Stationary)

Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.

GENERATORS (Electric)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Century Electric Co., 1806 Pine St., St. Louis 3, Mo.
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
Delco Products Div. General Motors Corp., 329 E. First St., Dayton 1, O.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
General Electric Co., Schenectady 5, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Lincoln Electric Co., The, Cleveland 1, O.
Master Electric Co., The, 100 Davis Ave., Dayton 1, O.
Reliance Electric & Eng. Co., 1088 Ivanhoe Rd., Cleveland 10, O.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

GENERATORS (Plating)

Hanson-Van Winkle-Munning Co., Matawan, N. J.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

GOGGLES (Safety)

Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

GRABS—FOR SHEETS, COILS, INGOTS

Mansaver Division, 3101 East St., New Haven 3, Conn.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

GRAINING

Japan Co., The, 5103 Lakeside Ave., Cleveland 14, O.

GRAPHITE

International Graphite & Electrode Corp., St. Marys, Pa.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

GRAPPLES

Blaw-Knox Div. of Blaw-Knox Co., Blawknox, Pa.
General Excavator Co., The, Marion, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago 5, Ill.
Osgood Co., The, Marion, O.
Owen Bucket Co., 6013 Breakwater Ave., Cleveland 2, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

GRATING

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Hendrick Mfg. Co., 37 Dundaff St. Carbondale, Pa.
Standard Steel Spring Co., Gary, Ind.
Tri-Lok Co., 5515 Butler St., Pittsburgh 1, Pa.

GREASE (Lubricating)—See LUBRICANTS (Industrial)

GREASE SEALS

Chicago Rawhide Mfg. Co., 1308 Elston Ave., Chicago 22, Ill.
Gits Brothers Mfg. Co., 1836 S. Kilbourn Ave., Chicago 23, Ill.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

GRILLS (Perforated Metal)

Diamond Mfg. Co., Wyoming, Pa.
Hendrick Mfg. Co., 37 Dundaff St. Carbondale, Pa.

GRINDER ATTACHMENTS

Blanchard Machine Co., The, 64 State St., Cambridge 39, Mass.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cincinnati Grinders, Incorporated, Cincinnati 9, O.
Fitchburg Grinding Machine Corp., Fitchburg, Mass.
Landis Machine Co., Waynesboro, Pa.
Lee, K. O., Company, Aberdeen, S. Dak.
Norton Co., Worcester 6, Mass.

GRINDER CENTERS

Firth-Sterling Steel Company, McKeesport, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

GRINDER HEADS

Fitchburg Grinding Machine Corp., Fitchburg, Mass.

GRINDERS (Automotive Reconditioning)

Heald Machine Co., The, Worcester 6, Mass.

GRINDERS (Bench & Floor Type)

Haskins, R. G., Co., 615 S. California Ave., Chicago 12, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.

GRINDERS (Broach)

Colonial Broach Co., P. O. Box 37, Harper Sta., Detroit 13, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Thompson Grinder Co., Inc., 1534 W. Main St., Springfield, O.

GRINDERS (Centerless—Internal and External)

Cincinnati Grinders, Incorporated, Cincinnati 9, O.
Heald Machine Co., The, Worcester 6, Mass.

GRINDERS (Chucking)

Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Fitchburg Grinding Machine Corp., Fitchburg, Mass.
Heald Machine Co., The, Worcester 6, Mass.

GRINDERS (Crank Pin, Cam, Piston, Valve Face)

Cincinnati Grinders, Incorporated, Cincinnati 9, O.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Norton Co., Worcester 6, Mass.

GRINDERS (Cylindrical)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cincinnati Grinders, Incorporated, Cincinnati 9, O.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Norton Co., Worcester 6, Mass.

GRINDERS (Die)

Fitchburg Grinding Machine Corp., Fitchburg, Mass.
Landis Machine Co., Waynesboro, Pa.
Thompson Grinder Co., Inc., 1534 W. Main St., Springfield, O.

GRINDERS (Oscillating)

Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.

GRINDERS (Plain and Universal)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cincinnati Grinders, Inc., Cincinnati 9, O.
Fitchburg Grinding Machine Corp., Fitchburg, Mass.
LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Lee, K. O., Company, Aberdeen, S. Dak.
Norton Co., Worcester 6, Mass.

GRINDERS (Portable)

Chicago Wheel & Manufacturing Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Cleveland Pneumatic Tool Co., The, 3781 E. 77th St., Cleveland 5, O.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.
Master Mfg. Co., Hutchinson, Kans.

GRINDERS (Precision Thread)

Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Jones & Lamson Machine Co., Springfield, Vt.
Landis Machine Co., Waynesboro, Pa.
Master Mfg. Co., Hutchinson, Kans.

GRINDERS (Roll)

Farrel-Birmingham Co., Inc., Ansonia, Conn.
Lewis Fdry. & Mach. Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Mesta Machine Co., P. O. Box 1466 Pittsburgh 30, Pa.
Norton Co., Worcester 6, Mass.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

GRINDERS (Shear Knife)

Fitchburg Grinding Machine Corp., Fitchburg, Mass.
Mattison Machine Works, Rockford, Ill.
Thompson Grinder Co., Inc., 1534 W. Main St., Springfield, O.

GRINDERS (Sheet Steel & Internal Tube)

Mattison Machine Works, Rockford, Ill.

GRINDERS (Single Slide Internal)

Bryant Chucking Grinder Co., 257 Clinton St., Springfield, Vt.

GRINDERS (Spline)

Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Fitchburg Grinding Machine Corp., Fitchburg, Mass.
Thompson Grinder Co., Inc., 1534 W. Main St., Springfield, O.

GRINDERS (Surface)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
DoAll Company, The, 231 N. Laurel Ave., Des Plaines, Ill.
Heald Machine Co., The, Worcester 6, Mass.
Mattison Machine Works, Rockford, Ill.
Norton Co., Worcester 6, Mass.
Reid Brothers Co., Inc., 140 Elliott St., Beverly, Mass.
Thompson Grinder Co., Inc., 1534 W. Main St., Springfield, O.

GRINDERS (Tool and Cutter)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Cincinnati Milling Machine Co., Cincinnati 9, O.
Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Fitchburg Grinding Machine Corp., Fitchburg, Mass.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis.
LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Lee, K. O., Co., Aberdeen, S. Dak.
Master Mfg. Co., Hutchinson, Kans.
Norton Co., Worcester 6, Mass.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.
Thompson Grinder Co., Inc., 1534 W. Main St., Springfield, O.

GRINDING (Shear Knife)

American Shear Knife Co., P.O. Box 355, Homestead, Pa.

GRINDING (Surface)

Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Industrial Gear Mfg. Co., 4545 W. Van Buren St., Chicago 24, Ill.
Master Mfg. Co., Hutchinson, Kans.
Ohio Tool Co., 3160 W. 160th St., Cleveland 11, O.

GRINDING MACHINES (Gear)

Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Fitchburg Grinding Machine Corp., Fitchburg, Mass.

GRINDING—PRECISION (Contract)

Ace Mfg. Corp., 1211 E. Erie Ave., Philadelphia 24, Pa.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Industrial Gear Mfg. Co., 4545 W. Van Buren St., Chicago 24, Ill.
Milton Mfg. Co., The, Milton, Pa.
Ohio Tool Co., 3160 W. 160th St., Cleveland 11, O.

GRINDING WHEELS

Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., The, Niagara Falls, N. Y.
Chicago Wheel and Mfg. Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Macklin Company, Jackson, Mich.
Norton Co., Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7, Mich.
Safety Grinding Wheel & Machine Co., P. O. Box 746, Springfield. O.
Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
Sterling Grinding Wheel, The, Div., of The Cleveland Quarries Co., Tiffin, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

GRINDING WHEELS (Mounted)

Bay State Abrasive Products Co., Westboro, Mass.
Blanchard Machine Co., The, 64 State St., Cambridge 39, Mass.
Carborundum Co., The, Niagara Falls, N. Y.
Chicago Wheel & Manufacturing Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Macklin Company, Jackson, Mich.
Norton Co., Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7, Mich.
Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.

GRINDING WHEELS (Segmental)

Bay State Abrasive Products Co., Westboro, Mass.
Blanchard Machine Co., The, 64 State St., Cambridge 39, Mass.
Carborundum Co., The, Niagara Falls, N. Y.
Macklin Company, Jackson, Mich.
Norton Co., Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7, Mich.
Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
Sterling Grinding Wheel, The, Div., of The Cleveland Quarries Co., Tiffin, O.

GUIDES (Mill)

Ampco Metal Inc., Dept. S12, Milwaukee 4, Wis.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
National Erie Corp., Erie, Pa.

GUIDES (Valve)

Ampco Metal Inc., Dept. S12, Milwaukee 4, Wis.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.

GUNS (Air Blow)

Heckethorn Mfg. & Supply Co., Littleton Col.

GUNS (Blast Furnace Mud)

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Brosius, Edgar E. Co., Sharpsburg P. O., Pittsburgh 15, Pa.

GUNS (Steam, Hydraulic, Electric)

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Brosius, Edgar E. Co., Sharpsburg P. O., Pittsburgh 15, Pa.

HAMMER BOARDS

Irwin Mfg. Co., Inc., Garland, Pa.

HAMMERS (Drop)

Alliance Machine Co., The, Alliance, O.
Chambersburg Engineering Co., Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
Industrial Brownhoist Corp., Bay City, Mich.
Morgan Engineering Co., The, Alliance, O.

HAMMERS (Pneumatic)

Cleveland Pneumatic Tool Co., The, 3781 E. 77th St., Cleveland 5, O.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

HAMMERS (Power)

Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

HAMMERS (Steam)

Alliance Machine Co., The, Alliance, O.
Chambersburg Engineering Co., Chambersburg, Pa.
Erie Foundry Co., Erie, Pa.
Industrial Brownhoist Corp., Bay City, Mich.
Morgan Engineering Co., The, Alliance, O.

HANGERS

Bantam Bearings Div., The Torrington Co., South Bend 21, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Bearings Division, General Motors Corp., Harrison, N. J.
Power Piping Div. of Blaw-Knox Co., Beaver & Western Ave., Pittsburgh 2, Pa.
SKF Industries, Inc., Front St. and Erie Ave., Philadelphia 34, Pa.

HARDENING (Flame)

Perfection Tool & Metal Heat Treating Co., 1740-58 W. Hubbard St., Chicago 22, Ill.

HARDENING (Tool)

Perfection Tool & Metal Heat Treating Co., 1740-58 W. Hubbard St., Chicago 22, Ill.

HARDENING & ANNEALING (Bright)

Perfection Tool & Metal Heat Treating Co., 1740-58 W. Hubbard St., Chicago 22, Ill.

HAULAGE SYSTEMS

Dempster Brothers, Inc., 294 Shea Rd., Knoxville 17, Tenn.

HEADING MACHINERY

National Machinery Co., The, Tiffin, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.

HEADS (Tank)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Legion Utensils Corp., 40th Ave. & 21st St., Long Island City 1, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Worth Steel Co., Claymont, Del.

HEAT EXCHANGERS

Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Niagara Blower Co., Dept. S-105, 6 E. 45th St., New York 17, N. Y.
Ross Heater & Mfg. Co., Inc., 1431 West Ave., Buffalo 13, N. Y.
Standard Tube Co., The, 14600 Woodward Ave., Detroit 3, Mich.
Stewart-Warner Corp., Heater Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.
Struthers Wells Corp., Titusville, Pa.

HEAT TREATING and HARDENING

Ace Mfg. Corp., 1211 E. Erie Ave., Philadelphia 24, Pa.
Amon-Schulte Co., 321 Ohio River Blvd., Emsworth, Pittsburgh 2, Pa.
Commercial Metals Treating, Inc., 177 S. St. Clair St., Toledo 1, O.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
Lakeside Steel Improvement Co., The, 5418 Lakeside Ave., Cleveland 14, O.
Milton Mfg. Co., The, Milton, Pa.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Perfection Tool & Metal Heat Treating Co., 1740-58 W. Hubbard St., Chicago 22, Ill.
Pittsburgh Commercial Heat Treating Co., 49th St., & A.V.R.R., Pittsburgh 1, Pa.

HEAT TREATING MATERIALS

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

HEATERS (Air)

Babcock & Wilcox Co., 85 Liberty St., New York 6, N. Y.
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Mahon, R. C., Co., The, 8650 Mt. Elliot Ave., Detroit 11, Mich.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Standard Tube Co., The, 14600 Woodward Ave., Detroit 3, Mich.

HEATERS (Instantaneous)

Ross Heater & Mfg. Co., Inc., 1431 West Ave., Buffalo 13, N. Y.

HEATERS (Unit)

American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Detroit 7, Mich.
Niagara Blower Co., Dept. S-105, 6 E. 45th St., New York 17, N. Y.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Stewart-Warner Corp., Heater Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Westinghouse Electric Corp., Mansfield, O.

HELMETS (Blast Cleaning)

American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Pangborn Corporation, Hagerstown, Md.
Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

HELMETS (Welding)

Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

HINGES AND BUTTS

Veeder-Root, Inc., Hartford 2, Conn.
Wagner, E. R., Mfg. Co., 4615 N. 32nd St., Milwaukee 9, Wis.

HITCHINGS (Mine Car)

American Chain & Cable Co., Inc., Bridgeport 2, Conn.

HOBBING MACHINES

Barber-Colman Co., 150 Loomis St., Rockford, Ill.

HOB CHECKING MACHINES

Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.

HOBS

Barber-Colman Co., 150 Loomis St., Rockford, Ill.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39, Ill.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.

HOBS (For Plastic Molds)

Sossner Co., 161 Grand St., New York 13, N. Y.

HOIST (Chain)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Chicago Tramrail Co., 2912 W. Carroll Ave., Chicago 12, Ill.
Chisholm-Moore Hoist Corp., 118 Fremont St., Tonawanda, N. Y.
Cleveland Tramrail Div., of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Ford Chain Block Div., American Chain & Cable Co., Inc., 2nd & Diamond Sts., Philadelphia 22, Pa.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Wright Mfg. Div. of American Chain & Cable Co., Inc., York, Pa.

HOISTS (Electric)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Browning, Victor R., Co., Inc., Willoughby, O.
Chicago Tramrail Co., 2912 W. Carroll Ave., Chicago 12, Ill.
Chisholm-Moore Hoist Corp., 118 Fremont St., Tonawanda, N. Y.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Industrial Brownhoist Corp., Bay City, Mich.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.
Wright Mfg. Div. of American Chain & Cable Co. Inc., York, Pa.

HOISTS (Monorail)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Chicago Tramrail Co., 2912 W. Carroll Ave., Chicago 12, Ill.
Chisholm-Moore Hoist Corp., 118 Fremont St., Tonawanda, N. Y.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

HOISTS (Pneumatic)

Curtis Pneumatic Machinery Div. of Curtis Mfg. Co., 1996 Kienlen Ave., St. Louis 20, Mo.
Galland-Henning Mfg. Co., 2747 S. 31st St., Milwaukee 7, Wis.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

HOISTS (Truck Body)

Dempster Brothers, Inc., 294 Shea Rd., Knoxville 17, Tenn.

HONING MACHINES

Micromatic Hone Corp., 8100 Schoolcraft Ave., Detroit 4, Mich.
Moline Tool Co., 102 20th St., Moline, Ill.
Snyder Tool & Engineering Co., 3400 E. Lafayette St., Detroit 7, Mich.

HOOKS (Chain)

American Chain Div. American Chain & Cable Co., Inc., York, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Phoenix Manufacturing Co., Catasauqua, Pa.

HOOPS (Welded Wire)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Keystone Steel & Wire Co., Peoria 7, Ill.

HOOPS—See BANDS AND HOOPS (Iron and Steel)

HOPPERS (Motorized)

Detroit Power Screwdriver Co., 2813 W. Fort St., Detroit 16, Mich.

HOSE (Flexible Metal)

American Metal Hose Branch of The American Brass Co., Waterbury 88, Conn.
Chicago Metal Hose Corp., 1315 S. Third St., Maywood, Ill.
Pennsylvania Flexible Metallic Tubing Co., 7250 Powers Lane, Philadelphia 42, Pa.

HOSE (Flexible Nonmetallic)

Weatherhead Co., The, 300 E. 131st St., Cleveland 8, O.

HOSE (Rubber)

Boston Woven Hose & Rubber Co., P.O. Box 1071, Boston 3, Mass.
Cleveland Pneumatic Tool Co., The, 3781 E. 77th St., Cleveland 5, O.
Gates Rubber Co., The, 999 S. Broadway, Denver 17, Colo.
Goodrich, B. F., Co., The, Akron 18, O.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Stewart-Warner Corp., Alemite Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.
Trabon Engineering Corp., 1818 E. 40th St., Cleveland 3, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

HOSE CLAMPS, FITTINGS, NIPPLES AND MENDERS

Boston Woven Hose & Rubber Co., P.O. Box 1071, Boston 3, Mass.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Kelly Machinery Co., 2524 W. Madison St., Chicago 12, Ill.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Stewart-Warner Corp., Alemite Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.
Trabon Engineering Corp., 1818 E. 40th St., Cleveland 3, O.

HYDRANTS AND STREET WASHERS

Zurn, J. A., Mfg. Co., Erie, Pa.

HYDRAULIC FLUID

Dow Corning Corp., P. O. Box 592, Midland, Mich.
Moraine Products Div., General Motors Corp., Dayton 1, O.

HYDRAULIC MACHINERY

Albert, L., & Son, Whitehead Rd., Trenton, N. J.
Alliance Machine Co., The, Alliance, O.
Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O. Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.
Bliss, E. W., Co., 53rd St. & First Ave., Brooklyn 32, N. Y.
Chambersburg Engineering Co., Chambersburg, Pa.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Hydraulic Machinery, Inc., 12825 Ford Rd., Dearborn, Mich.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Morgan Engineering Co., The, Alliance, O.
National Erie Corp., Erie, Pa.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
Wood, R. D., Co., 400 Chestnut St., Philadelphia 5, Pa.

HYDRAULIC PRESSES—See PRESSES (Hydraulic)

HYDRAULIC UNITS

Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Ex-Cell-O Corp. 1228 Oakman Blvd., Detroit 6, Mich.
Hydraulic Machinery, Inc., 12825 Ford Rd., Dearborn, Mich.
New York Air Brake Co., The, 420 Lexington Ave., New York 17, N. Y.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Sundstrand Machine Tool Co. 2540 Eleventh St., Rockford, Ill.
Weinman Pump & Supply Co., The, 207-209 Boulevard of the Allies, Pittsburgh 22, Pa.

INDICATORS (Blast Furnace Stock Line)

Bristol Co., The, Waterbury 91, Conn.
Brosius, Edgar E., Co., Sharpsburg P. O., Pittsburgh 15, Pa.

INDICATORS (Temperature)

Bristol Co., The, Waterbury 91, Conn.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.
Stewart-Warner Corp., Instrument Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.
Westinghouse Electric Corp., Orange Ave., Newark 1, N. J.

INDUCTION BRAZING and SOLDERING EQUIPMENT

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.

INDUCTION BRAZING AND SOLDERING EQUIPMENT

Johnson Gas Appliance Co., 573 "E" Ave., N.W., Cedar Rapids, Iowa.
Lepel High Frequency Laboratories, Inc., 39 W. 60 St., New York 23, N. Y.
Ohio Crankshaft Co., The, 3800 Harvard Ave., Cleveland 1, O.

INDUCTION HARDENING

Ace Mfg. Corp., 1211 E. Erie Ave., Philadelphia 24, Pa.
Chicago Screw Company, The, 1026 S. Homan Ave., Chicago 24, Ill.
Pittsburgh Commercial Heat Treating Co., 49th St. & A.V.R.R., Pittsburgh 1, Pa.

INDUCTION HEATING and HARDENING EQUIPMENT

Ajax Electrothermic Corp., Ajax Park, Trenton 5, N. J.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Lepel High Frequency Laboratories, Inc., 39 W. 60 St., New York 23, N. Y.
Ohio Crankshaft Co., The, 3800 Harvard Ave., Cleveland 1, O.
Westinghouse Electric Corp., Baltimore 3, Md.

INDUCTION MELTING EQUIPMENT

Saunders, Alexander, & Co., 95 Bedford St., New York 14, N. Y.

INFRA-RED EQUIPMENT (Baking, Drying, Dehydrating, Preheating)

Fostoria Pressed Steel Corp., The, Fostoria, O.

INGOT MOLD WASH (Graphite)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.

INGOT MOLDS

Bethlehem Steel Co., Bethlehem, Pa.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Shenango-Penn Mold Co., Oliver Bldg., Pittsburgh 22, Pa.
Valley Mould & Iron Co., Hubbard, O.

INHIBITORS

American Chemical Paint Co., Ambler, Pa.
Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.

INSPECTION EQUIPMENT

Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Wilkens-Anderson Co., 111 N. Canal St., Chicago 6, Ill.

INSPECTING TOOLS

Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

INSTRUMENTS (Counting)

Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Veeder-Root, Inc., Hartford 2, Conn.

INSTRUMENTS (Electric-Indicating and Recording)

Bristol Co., The, Waterbury 91, Conn.
Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
General Electric Co., Schenectady 5, N. Y.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.
Sticht, Herman H., Co., 27 Park Place, New York 7, N. Y.
Westinghouse Electric Corp., Dept. 7N, East Pittsburgh, Pa.

INSTRUMENTS (Testing)

Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Riehle Testing Machine Div. American Machine & Metals, Inc., E. Moline, Ill.
Wilkens-Anderson Co., 111 N. Canal St., Chicago 6, Ill.

INSULATING BLOCK OR BRICK

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Carborundum Co., The, Niagara Falls, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
National Fireproofing Corp., 208 E. Ohio St., Pittsburgh 12, Pa.
Owens-Corning Fiberglass Corp., 1873 Nicholas Bldg., Toledo 1, O.

INSULATING CONCRETE

Atlas Lumnite Cement Co., Dept. S, Chrysler Bldg., New York 17, N. Y.
Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

INSULATING POWDER AND CEMENT

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Owens-Corning Fiberglass Corp., 1873 Nicholas Bldg., Toledo 1, O.
Union Asbestos & Rubber Co., 1821 S. 54th Ave., Cicero 50, Ill.

INSULATION (Building)

Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Owens-Corning Fiberglass Corp., 1873 Nicholas Bldg., Toledo 1, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

INSULATION (Electrical)

Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.
Owens-Corning Fiberglass Corp., 1873 Nicholas Bldg., Toledo 1, O.

INSULATION (Furnace, Boiler Settings, Ovens, Steam Pipe, Etc.)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
Johns-Manville Corp., 22 E. 40th New York 16, N. Y.
Owens-Corning Fiberglass Corp., 1873 Nicholas Bldg., Toledo 1, O.
Union Asbestos & Rubber Co., 1821 S. 54th Ave., Cicero 50, Ill.

INTERCEPTORS (Grease & Solids)

Zurn, J. A., Mfg. Co., Erie, Pa.

IRON ORE

Alan Wood Steel Co., Conshohocken, Pa.
Cleveland-Cliffs Iron Co., The, Union Commerce Bldg., Cleveland 14, O.
Hanna Furnace Corp., The, Penobscot Bldg., Detroit 26, Mich.
Pickands Mather & Co., Union Commerce Bldg., Cleveland 14, O.
Shenango Furnace Co., Oliver Bldg., Pittsburgh 22, Pa.
Snyder, W. P., & Co., Oliver Bldg., Pittsburgh 22, Pa.

JAPANNING

Japan Co., The, 5103 Lakeside Ave., Cleveland 14, O.

JETS (Steam)

Heil Engineering Co., 12903 Elmwood Ave., Cleveland 11, O.

JIG BORERS

Bryant Machinery & Engineering Co., 400 W. Madison St., Chicago 6, Ill.
Cleereman Machine Tool Co., Green Bay, Wis.

JIGS AND FIXTURES

Ace Mfg. Corp., 1211 E. Erie Ave., Philadelphia 24, Pa.
Allied Products Corp., 4646 Lawton St., Detroit 8, Mich.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.
Mead Specialties Co., 4114 N. Knox Ave., Chicago 41, Ill.
Steel Products Engineering Co., The, 1205 W. Columbia St., Springfield, O.

KETTLES (Galvanizing)

National Annealing Box Co., Washington, Pa.

KEYS (Machine or Woodruff)

Moltrup Steel Products Co., Beaver Falls, Pa.

KEYSEATERS

Davis Keyseater Co., 399 Exchange St., Rochester 8, N. Y.

KEYSEATING MACHINES

Master Mfg. Co., Hutchinson, Kans.

KNIVES

American Shear Knife Co., P.O. Box 855, Homestead, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Cowles Tool Co., 2086 W. 110th St., Cleveland 2, O.
Disston, Henry, & Sons, Inc., 1126 Tacony, Philadelphia 35, Pa.

LABORATORY WARE

Bay State Abrasive Products Co., Westboro, Mass.
Norton Company, Worcester 6, Mass.
Wilkens-Anderson Co., 111 N. Canal St., Chicago 6, Ill.

LADLES

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Bethlehem Steel Co., Bethlehem, Pa.
Pennsylvania Eng. Works, New Castle, Pa.

LAMP GUARDS

McGill Mfg. Co., Inc., Valparaiso, Ind.

LAMPS (Infra-Red)

Fostoria Pressed Steel Corp., The, Fostoria, O.
Verd-A-Ray Corp., 615 Front St., Toledo 5, O.

LAPPING MACHINES

Cincinnati Grinders, Incorporated, Cincinnati 9, O.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
National Broach & Machine Co., 5600 St. Jean Ave., Detroit 18, Mich.
Norton Company, Worcester 6, Mass.

LARRIES (Coal)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Differential Steel Car Co., Findlay, O.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Vulcan Iron Works, Wilkes-Barre, Pa.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

LATHE ATTACHMENTS

Anker-Holth Mfg. Co., 2723 Connors St., Port Huron, Mich.
Bliss, E. W., Co., 53rd St. & First Ave., Brooklyn 32, N. Y.
LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.
Master Mfg. Co., Hutchinson, Kans.
Monarch Machine Tool Co., The, Sidney, O.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.
Universal Engineering Co., Frankenmuth, Mich.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.
Woodworth, N. A., Co., 1300 E. Nine Mile Rd., Detroit 20, Mich.

LATHE CENTERS

Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.
Spe-D-Cut Tool Co., Hannibal, Mo.

LATHE DOGS (Drop Forged)

South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

LATHE TOOLS (Carbide Tipped)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Spe-D-Cut Tool Co., Hannibal, Mo.

LATHES (Automatic)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Bullard Co., The, Bridgeport 2, Conn.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Jones & Lamson Machine Co., Springfield, Vt.
LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.
Monarch Machine Tool Co., The, Sidney, O.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.
Wickes Brothers, Saginaw, Mich.

LATHES (Buffing & Polishing)

Chicago Wheel & Mfg. Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.

LATHES (Chucking)

Bullard Co., The, Bridgeport 2, Conn.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

LATHES (Crankshaft)

LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Wickes Brothers, Saginaw, Mich.

LATHES (Double End)

Consolidated Machine Tool Corp., 565 Blossom Rd. Rochester 10, N. Y.
Snyder Tool & Engineering Co., 3400 E. Lafayette St., Detroit 7, Mich.
Wickes Brothers, Saginaw, Mich.

LATHES (Engine)

Consolidated Machine Tool Corp., 565 Blossom Rd. Rochester 10, N. Y.
LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Lehmann Machine Co., Chouteau Ave., at Grand, St. Louis 8, Mo.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.
Logan Engineering Co., 4901 W. Lawrence Ave., Chicago 30 Ill.
Monarch Machine Tool Co., The, Sidney, O.
Simmons Machine Tool Corp., 1755 N. Broadway, Albany 1, N. Y.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.
Wickes Brothers, Saginaw, Mich.

LATHES (Gap)

LeBlond, R. K., Machine Tool Co., Cincinnati 8, O.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.

LATHES (Gun)

Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
LeBlond, R. K. Machine Tool Co., The, Cincinnati 8, O.
Lehmann Machine Co., Chouteau Ave., at Grand, St. Louis 8, Mo.
Wickes Brothers, Saginaw, Mich.

LATHES (Hollow Spindle or Oil Country)

LeBlond, R. K., Machine Tool Co., Cincinnati 8, O.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.

LATHES (Manufacturing)

Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
LeBlond, R. K., Machine Tool Co., Cincinnati 8, O.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.
Monarch Machine Tool Co., The, Sidney, O.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.

LATHES (Railroad Car & Driving Wheel)

Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.

LATHES (Roll Turning)

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Consolidated Machine Tool Corp., 565 Blossom Rd. Rochester 10, N. Y.
Continental Foundry & Machine Co., E. Chicago, Ind.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Simmons Machine Tool Corp., 1755 N. Broadway, Albany 1, N. Y.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

LATHES (Tool Room)

LeBlond, R. K. Machine Tool Co., Cincinnati 8, O.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.
Monarch Machine Tool Co., The, Sidney, O.

LATHES (Turret)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Bullard Company, The, Bridgeport 2, Conn.
Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Jones & Lamson Machine Co., Springfield, Vt.
Logan Engineering Co., 4901 W. Lawrence Ave., Chicago 30, Ill.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.
Simmons Machine Tool Corp., 1755 N. Broadway Albany 1 N. Y.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

LATHES (Turret, Vertical)

Bullard Co., The, Bridgeport 2, Conn.

LEAD (Pigs)

Anaconda Sales Co., 25 Broadway, New York 4, N. Y.

LEAD (Red, White, Litharge)

National Lead Co., 111 Broadway, New York 6, N. Y.

LEAD (Sheets, Pipe, etc.)

National Lead Co., 111 Broadway, New York 6, N. Y.

LEAD (Tellurium)

National Lead Co., 111 Broadway, New York 6, N. Y.

LEVELING MACHINES

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Erie Foundry Co., Erie, Pa.
Hyde Park Foundry & Machine Co. Hyde Park, Pa.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Lewis Fdry. & Mach. Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
McKay Machine Co., The 546 W. Rayen St., Youngstown 2, O.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Paxson Machine Co., Benton Rd., Salem, O.
Wean Engineering Co., Inc., The, Warren, O.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

LIFT TRUCKS—See TRUCKS (Lift)

LIFTING MAGNETS—See MAGNETS (Lifting)

LIFTS (Monorail)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Cleveland Crane & Engineering Co., The, 1125 E. 283rd St., Wickliffe, O.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

LIGHTING (Fluorescent Equipment)

Fostoria Pressed Steel Corp., The, Fostoria, O.
General Electric Co., Bridgeport 2, Conn.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., 1216 W. 58th St., Cleveland 1, O.

LIGHTING (Industrial)

Fostoria Pressed Steel Corp., The, Fostoria, O.
Verd-A-Ray Corp., 615 Front St., Toledo 5, O.
Westinghouse Electric Corp., 1216 W. 58th St., Cleveland 1, O.

LIME (Chemical and Fluxing)

Baker, The J. E., Co., 114 N. George St., York, Pa.

LIMESTONE (Open Hearth & Blast Furnace)

Baker, The J. E., Co., 114 N. George St., York, Pa.
Basic Refractories, Inc., Hanna Bldg., Cleveland 15, O.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.

LINERS (Mill)

Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Taylor-Wharton Iron & Steel Co., Easton, Pa.

LINERS (Pump and Cylinder)

Harrisburg Steel Corp., Harrisburg, Pa.
Shenango-Penn Mold Co., 457 W. Third St., Dover, O.

LOCOMOTIVE CRANES—See CRANES (Locomotive)

LOCOMOTIVES (Diesel-Electric)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Davenport-Besler Corp., Davenport, Iowa.
Differential Steel Car Co., Findlay, O.
Fate-Root-Heath Co., Plymouth, O.
Plymouth Locomotive Works, Plymouth, O.
Porter, H. K., Company, Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.
Whitcomb Locomotive Co., Rochelle, Ill.

LOCOMOTIVES (Diesel-Mechanical)

Fate-Root-Heath Co., Plymouth, O.
Plymouth Locomotive Works, Plymouth, O.
Porter, H. K., Company, Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.
Whitcomb Locomotive Co., Rochelle, Ill.

LOCOMOTIVES (Electric)

Davenport-Besler Corp., Davenport, Iowa.
Porter, H. K., Company, Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.

LOCOMOTIVES (Electric Trolley)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Differential Steel Car Co., Findlay, O.
General Electric Co., Schenectady 5, N. Y.
Vulcan Iron Works, Wilkes-Barre, Pa.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.
Whitcomb Locomotive Co., Rochelle, Ill.

LOCOMOTIVES (Fireless)

Porter, H. K., Company, Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.

LOCOMOTIVES (Gasoline-Electric)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Davenport-Besler Corp., Davenport, Iowa.
Differential Steel Car Co., Findlay, O.
Fate-Root-Heath Co., Plymouth, O.
General Electric Co., Schenectady 5, N. Y.
Plymouth Locomotive Works, Plymouth, O.
Vulcan Iron Works, Wilkes-Barre, Pa.
Whitcomb Locomotive Co., Rochelle, Ill.

LOCOMOTIVES (Gasoline—Mechanical)

Davenport-Besler Corp., Davenport, Iowa.
Differential Steel Car Co., Findlay, O.
Fate-Root-Heath Co., Plymouth, O.
Plymouth Locomotive Works, Plymouth, O.
Vulcan Iron Works, Wilkes-Barre, Pa.
Whitcomb Locomotive Co., Rochelle, Ill.

LOCOMOTIVES (Oil-Electric)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Differential Steel Car Co., Findlay, O.
Vulcan Iron Works, Wilkes-Barre, Pa.

LOCOMOTIVES (Steam)

Davenport-Besler Corp., Davenport, Iowa.
Porter, H. K., Company, Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.
Vulcan Iron Works, Wilkes-Barre, Pa.

LOCOMOTIVES (Storage Battery)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
General Electric Co., Schenectady 5, N. Y.
Vulcan Iron Works, Wilkes-Barre, Pa.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.
Whitcomb Locomotive Co., Rochelle, Ill.

LOUVERS

Burt Mfg. Company, The, 400 S. High St., Akron 11, O.

LOW TEMPERATURE STORAGE EQUIPMENT

Deepfreeze, Div. of Motor Products Corp., 2309-7 Davis St., N. Chicago, Ill.

LUBRICANTS (Drawing)

Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
New York & New Jersey Lubricant Co., 292 Madison Ave., New York 17, N. Y.
Penola, Inc., 34th & Smallman Sts., Pittsburgh 1, Pa.
Shell Oil Co., Inc., 50 W. 50th St., New York 20, N. Y.

LUBRICANTS (Industrial)

Cities Service Oil Company, 70 Pine St., New York 5, N. Y.
Dow Corning Corp., P. O. Box 592, Midland, Mich.
Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Lubriplate Div., Fiske Bros. Refining Co., Newark 5, N. J., Toledo 3, O.
National Refining Co., The, Hanna Bldg., Cleveland 15, O.
New York & New Jersey Lubricant Co., 292 Madison Ave., New York 17, N. Y.
Penola, Incorporated, 34th & Smallman Sts., Pittsburgh 1, Pa.
Shell Oil Co., Inc., 50 W. 50th St., New York 20, N. Y.
Socony-Vacuum Oil Co., Inc., 26 Broadway, New York 4, N. Y.
Stewart-Warner Corp., Alemite Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.
Stuart, D. A., Oil Co., Ltd., 2735½ 17, N. Y.
Sun Oil Co., Dept. 1, 1608 Walnut St., Philadelphia 3, Pa.
Texas Co., The, 135 East 42nd St., New York 17, N. Y.
Tide Water Associated Oil Co., 17 Battery Place, New York 4, N. Y.

LUBRICATING DEVICES

Blaw-Knox Lubricators Div., Blawknox, Pa.
Farval Corp., The, 3270 E. 80th St., Cleveland 4, O.
Gits Brothers Mfg. Co., 1836 S. Kilbourn Ave., Chicago 23, Ill.
Stewart-Warner Corp., 1828 W. Diversey Pkway., Chicago 14, Ill.
Trabon Engineering Corp., 1818 E. 40th St., Cleveland 3, O.

LUBRICATING SYSTEMS

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Farval Corp., The, 3270 E. 80th St., Cleveland 4, O.
Stewart-Warner Corp., Alemite Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.
Trabon Engineering Corp., 1818 E. 40th St., Cleveland 3, O.

MACHINE WORK

Ace Mfg. Corp., 1211 E. Erie Ave., Philadelphia 24, Pa.
Allied Products Corp., 4646 Lawton St., Detroit 8, Mich.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Amon-Schulte Co., 321 Ohio River Blvd., Emsworth, Pittsburgh 2, Pa.
Avondale Marine Ways, Inc., Westwego, La.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Continental Foundry & Machine Co., E. Chicago, Ind.
Covert Mfg. Co., Heyman Machine Div., Troy, N. Y.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Federal Shipbuilding & Dry Dock Co., Kearny, N. J.
General Engineering & Mfg. Co., 1523 S. 10th St., St. Louis 4, Mo.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hyde Park Foundry & Machine Co., Hyde Park, Pa.
Joyce Machine Co., Hatboro, Pa.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York
Morgan Engineering Co., The Alliance, O.
Ohio Tool Co., 3160 W. 160th St., Cleveland 11, O.
Ottumwa Iron Works, Ottumwa, Ia.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Scaife Co., Ann St., Oakmont Pa.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
Warren City Mfg. Co., Warren, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

MACHINERY (Automatic Transfer Processing)

Greenlee Bros. & Co., 1927 Mason Ave., Rockford, Ill.

MACHINERY (Die-Casting)

Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Lester-Phoenix, Inc., 2629 Church Ave., Cleveland 13, O.

MACHINERY (Flexible Shaft)—See FLEXIBLE SHAFT MACHINERY

MACHINERY (Plastic Molding)

Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Lester-Phoenix, Inc., 2629 Church Ave., Cleveland 13, O.

MACHINERY (Special)

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Alliance Machine Co., The, Alliance, O.
American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Atlas Tool & Designing Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Baldwin Southwark Div., Baldwin Locomotive Works, The, Pascall P. O. Philadelphia 42, Pa.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Brosius, Edgar E., Co., Sharpsburg P. O., Pittsburgh 15, Pa.
Cleveland Automatic Machine Co., The, 2269 Ashland Rd., Cleveland 3, O.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Continental Foundry & Machine Co., E. Chicago, Ind.
Covert Mfg. Co., Heyman Machine Div., Troy, N. Y.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
DoAll Company, The, 231 N. Laurel Ave., Des Plaines, Ill.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
General Engineering & Mfg. Co., 1523 S. 10th St., St. Louis 4, Mo.
Greenlee Bros. & Co., 1927 Mason Ave., Rockford, Ill.
Guibert Steel Co., P. O. Box 1837, Pittsburgh, Pa.
Hallden Machine Co., The, Thomaston, Conn.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Hydraulic Machinery, Inc., 12825 Ford Rd., Dearborn, Mich.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Joyce Machine Co., Hatboro, Pa.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Moline Tool Co., 102 20th St., Moline, Ill.
Morgan Engineering Co., The Alliance, O.
National Automatic Tool Co., S. 7th & N Sts., Richmond, Ind.
National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich.
National Erie Corp., Erie, Pa.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Oil Well Supply Co., Dallas 1, Texas.
Paxson Machine Co., Benton Rd., Salem, O.
Safety Grinding Wheel & Machine Co., P. O. Box 746, Springfield, O.
Shuster, F. B., Mfg. Co., Inc., The, New Haven 9, Conn.
Simmons Machine Tool Corp., 1755 N. Broadway, Albany 1, N. Y.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.
Steel Products Engineering Co., 1205 W. Columbia St., Springfield, O.
Stokerunit Corp., 4548 W. Mitchell St., Milwaukee 14, Wis.
Struthers Wells Corp., Titusville, Pa.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
Thompson Grinder Co., Inc., 1534 W. Main St., Springfield, O.
United Engineering & Fdry Co., First National Bank Bldg., Pittsburgh 22, Pa.
U. S. Automatic Corp., Amherst, O.
Warren City Mfg. Co., Warren, O.
Wean Engineering Co., Inc., The, Warren, O.
Wood, R. D., Co., 400 Chestnut St., Philadelphia 5, Pa.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.
Youngstown Welding & Eng. Co. The, 3711 Oakwood Ave., Youngstown 9, O.

MACHINERY (Used & Rebuilt)

Albert, L. & Son, Whitehead Rd., Trenton, N. J.
Dulien Steel Products, Inc. 1008 Western Ave., Seattle 4, Wash.
General Blower Co., Morton Grove, Ill.
Iron & Steel Products, Inc., Hegewisch Sta., Chicago 33, Ill.
Simmons Machine Tool Corp., 1755 N. Broadway, Albany 1, N. Y.
Sonken-Galamba Corp., 108 N. 2nd St., Kansas City, Kansas
West Penn Machinery Co., 1208 House Bldg., Pittsburgh 22, Pa.

MACHINERY (Vending)

Gerding Bros., 5 E. Third St., Cincinnati 2, O.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.

MACHINERY (WELDING WIRE)

Shuster, F. B., Mfg. Co., Inc., The New Haven 9, Conn.

MACHINES (Marking)

Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

MACHINES (Photocopying)

American Photocopy Equipment Co., 2849 N. Clark St., Chicago 14, Ill.
Ozalid Products Div., General Analine & Film Corp., Johnson City, N. Y.

MAGNESIA (Electrically Fused)

Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Norton Co., Worcester 6, Mass.

MAGNESIA-REFRACTORIES—See REFRACTORIES (Magnesia)

MAGNESIUM

Dow Chemical Co., The, Midland, Mich.

MAGNETIC SEPARATORS—See SEPARATORS (Magnetic)

MAGNETS (Lifting)

Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Ohio Electric Mfg. Co., The, 5906 Maurice Ave., Cleveland 4, O.

MAGNETS (Separating)

Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Ohio Electric Mfg. Co., The, 5906 Maurice Ave., Cleveland 4, O.

MANDRELS (Expanding)

Lee, K. O., Company, Aberdeen, S. Dak.

MANGANESE METAL AND ALLOYS

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Taylor-Wharton Iron & Steel Co., Easton, Pa.

MANGANESE ORE

Samuel, Frank & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

MANIFOLDS (Cylinder)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

MANIPULATORS

Alliance Machine Co., The, Alliance, O.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Brosius, Edgar E., Co., Sharpsburg P. O., Pittsburgh 15, Pa.
Continental Foundry & Machine Co., E. Chicago, Ind.
Mesta Machine Co., P. O. Box 1466 Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

MARKING DEVICES

American Crayon Co., Sandusky, O.
Cunningham, M. E., Co., 172 E. Carson St., Pittsburgh 19, Pa.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

METAL (Perforated)—See PERFORATED METAL

METAL CLEANERS

American Chemical Paint Co., Ambler, Pa.
Detrex Corporation, 13029 Hillview Ave., Detroit 4, Mich.

METAL CLEANERS (Con.)

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Holden, A. F., Co., The, P.O. Box 1898, New Haven 8, Conn.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.
Pennsylvania Salt Mfg. Co., Dept. S. Pennsalt Cleaner Div., Philadelphia 7, Pa.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

METAL CLEANING MACHINES

American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Bullard Co., The, Bridgeport 2, Conn.
Detrex Corporation, 13029 Hillview Ave., Detroit 4, Mich.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Pangborn Corporation, Hagerstown, Md.
Ransohoff, N., Inc., 1317 Township Ave., Cincinnati 16, O.
Salem Engineering Co., 714 S. Broadway, Salem, O.

METAL DUPLICATION (Without Dies)

O'Neil-Irwin Mfg. Co., 304 8th Ave., So., Minneapolis 15, Minn.

METAL FINISHES

American Chemical Paint Co., Ambler, Pa.
Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.

METAL POWDERS—See POWDERS, (Metal)

METAL WASHING EQUIPMENT

American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Detrex Corp., 13029 Hillview Ave., Detroit 4, Mich.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.

METALS (Nonferrous)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Brass Co., The, Waterbury 88, Conn.
Ampco Metal Inc., Dept. S12, Milwaukee 4, Wis.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Bridgeport Brass Co., Bridgeport, Conn.
Bunting Brass & Bronze Co., The, 715 Spencer St., Toledo 1, O.
Cadman, A. W. Mfg. Co., 28th & Smallman Sts., Pittsburgh 22, Pa.
Copperweld Steel Co., Warren, O.
Dow Chemical Co., The, Midland, Mich.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
Harper, The, H. M. Co., 2646 Fletcher St., Chicago 18, Ill.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Metal Hydrides, Inc., 12-24 Congress St., Beverly, Mass.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.
Penn Brass & Copper Co., Erie, Pa.
Revere Copper & Brass Inc., 230 Park Ave., New York 17, N. Y.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Riverside Metal Co., Riverside, N. J.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Shenango-Penn Mold Co., 437 W. Third St., Dover, O.
Western Brass Mills, Div. of Olin Industries, East Alton, Ill.

METALS (Nonferrous—Corrosion & Abrasive Resistant)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
Metal Hydrides, Inc., 12-24 Congress St., Beverly, Mass.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

METALS (Prefinished)

American Nickeloid Co., 1310 Second St., Peru, Ill.

METALS (Silver Clad)

Handy & Harman, 82 Fulton St., New York 7, N. Y.

MICROMETERS

Brown & Sharpe Mfg. Co., Providence 1, R. I.

MILLING CUTTERS

Barber-Colman Co., 150 Loomis St., Rockford, Ill.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Cowles Tool Co., 2086 W. 110th St., Cleveland 2, O.
Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39, Ill.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Spe-D-Cut Tool Co., 9th & Lyons Sts., Hannibal, Mo.

MILLING CUTTER (Carbide Tipped)

Continental Tool Works Div. of Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Cowles Tool Co., 2086 W. 110th St., Cleveland 2, O.
Firth Sterling Steel Co., McKeesport, Pa.
Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39, Ill.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Spe-D-Cut Tool Co., Hannibal, Mo.
Tungsten Carbide Tool Co., Div. of Michigan Tool Co., Detroit, Mich.

MILLING MACHINE ATTACHMENTS

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cincinnati Milling Machine Co., Cincinnati 9, O.
Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis.

MILLING MACHINES

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cincinnati Milling Machine Co., Cincinnati 9, O.
Cincinnati Planer Co., Cincinnati 9, O.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee, Wis.
Master Mfg. Co., Hutchinson, Kans.
Moline Tool Co., 102 20th St., Moline, Ill.
National Broach & Machine Co., 5600 St. Jean Ave., Detroit 18, Mich.
Ohio Machine Tool Co., The, Kenton, O.
Simmons Machine Tool Corp., 1755 N. Broadway, Albany 1, N. Y.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich
Stokerunit Corp., 4548 W. Mitchell St., Milwaukee 14, Wis.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.

MILLING MACHINES (Milling and Centering Combined)

Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Jones & Lamson Machine Co., Springfield, Vt.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.

MILLS (Blooming, Universal, Plate, Sheet, Tin, Bar, Strip, Etc.)—See ROLLING MILL EQUIPMENT

MIXERS (Hot Metal)

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.

MIXING EQUIPMENT

Porter, H. K., Company, Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.

MOLD PLUGS

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.

MOLDS (Ingot)—See INGOT MOLDS

MOLYBDENUM

Climax Molybdenum Co., 500 Fifth Ave., New York 18, N. Y.
Molybdenum Corp. of America, Grant Bldg., Pittsburgh 19, Pa.

MONEL METAL (All Commercial Forms)

International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.

MONORAIL SYSTEMS

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283 St., Wickliffe, O.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

MOTION PICTURE EQUIPMENT

Eastman Kodak Co., 343 State St., Rochester 4, N. Y.

MOTOR CONTROLS

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Federal Electric Products Co., 50 Paris St., Newark 5, N. J.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

MOTOR-GENERATORS

Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.

MOTORS (Electric)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Century Electric Co., 1806 Pine St., St. Louis 3, Mo.
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
Delco Products Div. General Motors Corp., 329 E. First St., Dayton 1, O.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
General Electric Co., Schenectady 5, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Lincoln Electric Co., The, Cleveland 1, O.
Master Electric Co., The, 100 Davis Ave., Dayton 1, O.
Reliance Electric & Eng. Co., 1088 Ivanhoe Rd., Cleveland 10, O.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.
Wesche, B. A., Electric Co., The, 1628 Vine St., Cincinnati 10, O.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

MOULDINGS (Metal)

Brasco Mfg. Co., Harvey, Ill.

MOUNTINGS (Rubber)

Goodrich, B. F., Co., The, Akron 18, O.
Harris Products Co., 634 Huron Rd., Cleveland 15, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

MUCK BAR

Samuel, Frank, & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

MUFFLERS (Spark Arresting)

Donaldson Co., Inc., 666 Pelham St., St. Paul 4, Minn.

NAILS (*Also Stainless)

Alan Wood Steel Co., Conshohocken, Pa.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
*Columbia Steel Co., San Francisco 6, Cal.
Continental Steel Corp., Kokomo, Ind.
*Hassall, John, Inc., 402 Oakland St., Brooklyn 22, N. Y.
*Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
*Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
*Republic Steel Corp., Dept. ST, Cleveland 4, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Wickwire Brothers, Inc., 189 Main St., Cortland, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

NAILS (Coated & Galvanized)

Alan Wood Steel Co., Conshohocken, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Wickwire Brothers, Inc., 189 Main St., Cortland, N. Y.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

NAME PLATES

Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

NIBBLING MACHINES

Campbell, Andrew C., Div. American Chain & Cable Co., Inc., Brideport 2, Conn.

NICKEL (All Commercial Forms)

International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.

NITRIDING

Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Nitralloy Corp., The, 230 Park Ave., New York 17, N. Y.
Pittsburgh Commercial Heat Treating Co., 49th St. & A.V.R.R., Pittsburgh 1, Pa.

NOZZLES

Aldrich Pump Co., The 8 Pine St., Allentown, Pa.
American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Federal Foundry Supply Co., The, 4600 E. 71st St., Cleveland 5, O.
National Foundry Sand Co., 2970 W. Grand Blvd., Detroit 2, Mich.
Pangborn Corp., Hagerstown, Md.

NUTS (*Also Stainless)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Bethlehem Steel Co., Bethlehem, Pa.

NUTS (*Also Stainless) (Con.)

Boss Bolt & Nut Co., Div. of The Lock Nut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
*Harper, H. M. Co., The, 2646 Fletcher St., Chicago 18, Ill.
*Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
*Manufacturers Screw Products, 216 W. Hubbard St., Chicago 10, Ill.
Milton Mfg. Co., The, Milton, Pa.
*National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
*Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
*Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Tinnerman Products, Inc., 2039 Fulton Rd., Cleveland 13, O.
Triplex Screw Co., 5341 Grant Ave., Cleveland 5, O.

NUTS (Acorn or Cap)

Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Harper Co., H. M., The, 2646 Fletcher St., Chicago 18, Ill.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
U. S. Automatic Corp., Amherst, O.

NUTS (Castellated)

Bethlehem Steel Co., Bethlehem, Pa.
Chicago Screw Company, The, 1026 S. Homan Ave., Chicago 24, Ill.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Acme Co., The, 170 E. 131 St., Cleveland 8, O.
Milton Mfg. Co., The, Milton, Pa.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
U. S. Automatic Corp., Amherst, O.

NUTS (Machine Screw)

Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
U. S. Automatic Corp., Amherst, O.
Western Automatic Machine Screw Co., Elyria, O.

NUTS (Nonferrous)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Chicago Screw Company, The, 1026 S. Homan Ave., Chicago 24, Ill.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
U. S. Automatic Corp., Amherst, O.

NUTS (Self Locking)

Bethlehem Steel Co., Bethlehem, Pa.
Boss Bolt & Nut Co., Div. of The Lock Nut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.
Tinnerman Products, Inc., 2039 Fulton Rd., Cleveland 13, O

NUTS (Semi-finished)

Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Chicago Screw Company, The, 1026 S. Homan Ave., Chicago 24, Ill.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
Milton Mfg. Co., The, Milton, Pa.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS (Spring—Tension)

Tinnerman Products, Inc., 2039 Fulton Rd., Cleveland 13, O.

NUTS (Wing)

National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

OFFICE EQUIPMENT

Remington-Rand Inc., Systems Div., 415 Fourth Ave., New York 10, N. Y.

OIL CUPS

Gits Brothers Mfg. Co., 1836 S. Kilbourn Ave., Chicago 23, Ill.
Stewart-Warner Corp., 1828 W. Diversey Pkwy., Chicago 14, Ill.

OIL SEALS

Chicago Rawhide Mfg. Co., 1308 Elston Ave., Chicago 22, Ill.
Gits Brothers Mfg. Co., 1836 S. Kilbourn Ave., Chicago 23, Ill.

OILS (Compressor)

Cities Service Co., 70 Pine St., New York 5, N. Y.
Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Shell Oil Co., Inc., 50 W. 50th St., New York 20, N. Y.
Socony-Vacuum Oil Co., Inc., 26 Broadway, New York 4, N. Y.
Texas Co., The, 135 East 42nd St., New York 17, N. Y.

OILS (Cutting)

Cities Service Co., 70 Pine St., 70 Pine St., New York 5, N. Y.
DoAll Company, The, 231 N. Laurel Ave., Des Plaines, Ill.
Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
National Refining Co., The, Hanna Bldg., Cleveland 15, O.
Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.
Penola, Incorporated, 34th & Smallman Sts., Pittsburgh 1, Pa.
Shell Oil Co., Inc., 50 W. 50th St., New York 20, N. Y.
Socony-Vacuum Oil Co., Inc., 26 Broadway, New York 4, N. Y.
Stuart, D. A., Oil Co., Ltd., 2735½ S. Troy St., Chicago 23, Ill.
Sun Oil Co., Dept. 1, 1608 Walnut St., Philadelphia 3, Pa.
Texas Co., The, 135 East 42nd St., New York 17, N. Y.
Tide Water Associated Oil Co., 17 Battery Place, New York 4, N. Y.

OILS (Lubricating)—See LUBRICANTS (Industrial)

OILS (Quenching)

Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Stuart, D. A., Oil Co., Ltd., 2735½ S. Troy St., Chicago 23, Ill.

OPEN-HEARTH FURNACES—See FURNACES (Open-Hearth)

OVENS (Annealing, Japanning, Tempering)

Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
Hagan, George J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Industrial Oven Engineering Co., The 11621 Detroit Ave., Cleveland 2, O.
Maehler, Paul, Co., The, 2208 W. Lake St., Chicago 12, Ill.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Mahr Mfg. Co., Div. of Diamond Iron Works, Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Saunders, Alexander, & Co., 95 Bedford St., New York 14, N. Y.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

OVENS (Baking & Drying)

Fostoria Pressed Steel Corp., The, Fostoria, O.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

OVENS (Coke, By-Product)

Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

OVENS (Core and Mold)

Despatch Oven Co., 619 Eighth St., S.E., Minneapolis 14, Minn.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Maehler, Paul, Co., The, 2208 W. Lake St., Chicago 12, Ill.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Mahr Mfg. Co., Div. of Diamond Iron Works Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

OVENS (Gas or Oil Heat)

Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Maehler, Paul, Co., The, 2208 W. Lake St., Chicago 12, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Works Inc., 1728 2nd St., N., Minneapolis 11, Minn.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

OXY-ACETYLENE WELDING AND CUTTING—See WELDING

OXYGEN

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Independent Engineering Co., 105 W. Second St., O'Fallon, Ill.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.

PACKAGING (Protective)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Japan Co., The, 5103 Lakeside Ave., Cleveland 14, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

PACKING (Asbestos or Rubber)

Goodrich, B. F., Co., The, Akron 18, O.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Union Asbestos & Rubber Co., 1821 S. 54th Ave., Cicero 50, Ill.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

PACKING (Carbon or Graphite)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.

PACKINGS (Condensed Tube)

Crane Packing Co., 1879 Cuyler Ave., Chicago 13, Ill.

PACKINGS (Fabric)

Crane Packing Co., 1879 Cuyler Ave., Chicago 13, Ill.

PACKINGS (Mechanical Leather)

Chicago Rawhide Mfg. Co., 1308 Elston Ave., Chicago 22, Ill.
Graton & Knight Co., 322 Franklin St., Worcester 4, Mass.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

PACKINGS (Metallic and Semi-Metallic)

Crane Packing Co., 1879 Cuyler Ave., Chicago 13, Ill.
Union Asbestos & Rubber Co., 1821 S. 54th Ave., Cicero 50, Ill.

PACKINGS (Plastic)

Crane Packing Co., 1879 Cuyler Ave., Chicago 13, Ill.

PAINT (Alkali Resisting)

Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.

PAINT (Aluminum)

Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O.
Koppers Co., Tar & Chemical Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

PAINT (Aluminum Pigment)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

PAINT (Heat Resisting, Rust Preventing, Priming)

Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O.
American Chemical Paint Co., Ambler, Pa.
Koppers Co., Tar & Chemical Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.

PAINT (Marking)

American Crayon Co., Sandusky, O.
Koppers Co., Tar & Chemical Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

PAINT (Stick Form)

American Crayon Co., Sandusky, O.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

PAINTING

Hanlon-Gregory Galvanizing Co., 5515 Butler St., Pittsburgh 1, Pa.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.

PAINTING, LACQUERING, ENAMELING

Japan Co., The, 5103 Lakeside Ave., Cleveland 14, O.

PAINTS, LACQUERS and VARNISHES (Industrial)

Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O.
Dow Corning Corp., P. O. Box 592, Midland, Mich.
Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.
National Lead Co., 111 Broadway, New York 6, N. Y.
Pittsburgh Plate Glass Co., Paint Div., 632 Duquesne Way, Pittsburgh 22, Pa.
Standard Varnish Works, 2600 Richmond Terrace Staten Island 3, N. Y.

PAPER (Sensitized Photocopying)

American Photocopy Equipment Co., 2849 N. Clark St., Chicago 14, Ill.
Eastman Kodak Co., 343 State St., Rochester 4, N. Y.
Ozalid Products Div., General Aniline & Film Corp., Johnson City, N. Y.

PARTS (Precision)

Ace Mfg. Corp., 1211 E. Erie Ave., Philadelphia 24, Pa.
Allied Products Corp., 4646 Lawton St., Detroit 8, Mich.
Amon-Schulte Co., 321 Ohio River Blvd., Emsworth, Pittsburgh 2, Pa.
Atlas Tool & Designing Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Chicago Screw Company, The, 1026 S. Homan Ave., Chicago 24, Ill.
Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Joyce Machine Co., Hatboro, Pa.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.

PARTS (Precision-Diesel)

Aircraft & Diesel Equipment Corp., 4401 N. Ravenswood Ave., Chicago 40, Ill.
Allied Products Corp., 4646 Lawton St., Detroit 8, Mich.
Chicago Screw Company, The, 1026 S. Homan Ave., Chicago 24, Ill.

PATTERNS (Wood or Metal)

Wellman Bronze & Aluminum Co., The, 2539 E. 93 St., Cleveland 4, O.

PERFORATED METAL

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Chicago Perforating Co., 2443 W. 24th Pl., Chicago 8, Ill.
Diamond Mfg Co., Wyoming, Pa
Erdle Perforating Co., 171 York St., Rochester 11, N. Y.
Harrington & King Perforating Co., The, 5634 Fillmore St., Chicago 44, Ill.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

PHENOL RECOVERY PLANTS

Koppers Co., Engineering and Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

PHOSPHOR BRONZE—See METALS (Nonferrous)

PHOTO TEMPLATE EQUIPMENT

Eastman Kodak Co., 343 State St., Rochester 4, N. Y.

PHOTOGRAPHIC EQUIPMENT AND SUPPLIES

Eastman Kodak Co., 343 State St., Rochester 4, N. Y.

PICKERS (Vacuum and Mechanical)

Littell, F. J., Machine Co., 4165 N. Ravenswood Ave., Chicago 13, Ill.

PICKLING

Hanlon-Gregory Galvanizing Co., 5515 Butler St., Pittsburgh 1, Pa
Japan Co., The, 5103 Lakeside Ave., Cleveland 14, O.

PICKLING COMPOUNDS

American Chemical Paint Co., Ambler, Pa.
Cleveland Cliffs Iron Co., The, Union Commerce Bldg., Cleveland 14, O.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.

PICKLING EQUIPMENT

International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Ransohoff, N., Inc., 1317 Township Ave., Cincinnati 16, O.
Rolock, Inc., 1380 Kings Highway, Fairfield, Conn.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Youngstown Welding & Eng. Co., 3711 Oakwood Ave., Youngstown 9, O.

PICKLING MACHINERY

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Erie Foundry Co., Erie, Pa.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Wean Engineering Co., Inc., The, Warren, O.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

PICKLING TANK LININGS

Cellcote Co., 750 Rockefeller Bldg., Cleveland 13, O.
Goodrich, B. F., Co., The, Akron 18, O.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
National Lead Co., 111 Broadway, New York 6, N. Y.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

PICKLING TANKS—See TANKS (Pickling)

PIG CASTING MACHINES

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.

PIG IRON

Alan Wood Steel Co., Conshohocken, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Brooke, E. & G., Iron Co., Birdsboro, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Cleveland-Cliffs Iron Co., The, Union Commerce Bldg., Cleveland 14, O.
Hanna Furnace Corp., The, Penobscot Bldg., Detroit 26, Mich.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Pickands Mather & Co., Union Commerce Bldg., Cleveland 14, O.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Samuel, Frank & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.
Shenango Furnace Co., Oliver Bldg., Pittsburgh 22, Pa.
Snyder, W. P., & Co., Oliver Bldg., Pittsburgh 22, Pa.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.

PIG IRON (Silvery)

Hanna Furnace Corp., The, Penobscot Bldg., Detroit 26, Mich.
Jackson Iron & Steel Co., Jackson, O.
Keokuk Electro-Metals Co., Keokuk, Ia.
Miller & Co., 332 S. Michigan Ave., Chicago 4, Ill.

PILING (Iron and Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept ST, Cleveland 4, O.
Weirton Steel Co., Weirton, W. Va.

PILING (Pipe)

American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

PILING (Pressure-Treated Wood)

Koppers Co., Wood Preserving Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

PILLOW BLOCKS (Anti-Friction)

Dodge Manufacturing Corp., Mishawaka, Ind.
Link-Belt Co., 519 N. Holmes Ave., Indianapolis 6, Ind.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
SKF Industries, Inc., Front St. & Erie Ave., Philadelphia 34, Pa.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.

PILLOW BOXES

Norma-Hoffmann Bearings Corp., Stamford, Conn.

PINIONS (Mill)

Bethlehem Steel Co., Bethlehem, Pa.
Continental Foundry & Machine Co., E. Chicago, Ind.
Ferrel-Birmingham Co., Inc., Ansonia, Conn.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
Lewis Fdry. & Mach. Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
National Erie Corp., Erie, Pa.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.
United Engineering & Foundry Co., First National Bank Bldg., Pittsburgh 22, Pa.

PINS (Case Hardened or Heat Treated)

Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
U. S. Automatic Corp., Amherst, O.

PINS (Piston)

McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.

PINS (Taper)

Chicago Screw Company, The, 1026 S. Homan Ave., Chicago 24, Ill.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.
Moltrup Steel Products Co., Beaver Falls, Pa.
U. S. Automatic Corp., Amherst, O.

PIPE (Alloy) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
*Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
*Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
*National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
*Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

PIPE (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Dow Chemical Co., The, Midland, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

PIPE (Brass, Bronze or Copper)

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
Revere Copper & Brass Co., Inc., 230 Park Ave., New York 17, N. Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Shenango-Penn Mold Co., 457 W. Third St., Dover, O.

PIPE (Cement Lined)

American Cast Iron Pipe Co., 2030 N. 16th St., Birmingham 2, Ala.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.

PIPE (Lead or Lead Lined)

National Lead Co., 111 Broadway, New York 6, N. Y.

PIPE (Non-Metallic)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.

PIPE (Rubber Lined)

Goodrich, B. F., Co., The, Akron 18, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

PIPE (Square and Rectangular)

Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

PIPE (Steel)

Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
American Cast Iron Pipe Co., 2030 N. 16th St., Birmingham 2, Ala.
American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa
Columbia Steel Co., San Francisco 6, Calif.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.
Wheeling Steel Corp., Wheeling W. Va.
Youngstown Sheet & Tube Co., The Youngstown 1, O.

PIPE (Steel, Fabricated)

Power Piping Div. of Blaw-Knox Co., Beaver & Western Ave., Pittsburgh 2, Pa.

PIPE BENDING

Power Piping Div. of Blaw-Knox Co., Beaver & Western Ave., Pittsburgh 2, Pa
Tubular Service Corp., 32 Broadway, New York 4, N. Y.

PIPE and TUBE BENDING MACHINES

American Pipe Bending Machine Co., Inc., 11 Furnace St., Poultney, Vt.
Pines Engineering Co., 215 S. Highland, Aurora, Ill.

PIPE COUPLINGS

Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.

PIPE CUTTING AND THREADING MACHINERY

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Landis Machine Co., Waynesboro, Pa.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.
Pines Engineering Co., 215 S. Highland, Aurora, Ill.
Pratt-Roop Co., Louisville, Ky.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.

PIPE FITTINGS

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.

PIPE JOINT & SEALING COMPOUNDS

Crane Packing Co., 1879 Cuyler Ave., Chicago 13, Ill.

PIPE LINES (Riveted or Welded)

Bethlehem Steel Co., Bethlehem, Pa.

PIPE MACHINING EQUIPMENT

Pines Engineering Co., 215 S. Highland, Aurora, Ill.

PIPE MILL MACHINERY

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

PIPE STRAIGHTENING MACHINERY

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.

PIPE TOOLS

Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Greenfield Tap & Die Corp., Greenfield, Mass.
Oster Mfg. Co., The, 2037 E. 61st., Cleveland 3, O.
Pines Engineering Co., 215 S. Highland, Aurora, Ill.

PIPING CONTRACTORS

Power Piping, Div. of Blaw-Knox Co., Beaver and Western Ave., Pittsburgh 2, Pa.

PISTON RINGS

American Hammered Piston Ring Div., Koppers Co., Baltimore 8, Md.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.

PISTON RODS

Bliss & Laughlin, Inc., Harvey, Ill
Finkl, A., & Sons Co., 2011 N. Southport Ave., Chicago 14, Ill.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Union Drawn Steel Div., Republic Steel Corp., Massillon, O.
Wyckoff Steel Co., P.O. Box 1256, Pittsburgh 30, Pa.

PISTONS (Aluminum, Gray Iron)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Aluminum Industries, Inc., 2438 Beekman St., Cincinnati 25, O.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.
Permold Co., The, 830 W. Liberty St., Medina, O.
Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.

PLANERS

Baldwin Southwark Div. Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa
Ohio Machine Tool Co., The, Kenton, O.
Rockford Machine Tool Co., 2400 Kishwaukee St., Rockford, Ill.
Simmons Machine Tool Corp., 1755 N. Broadway, Albany 1, N. Y.

PLANERS (Vertical)

Cincinnati Planer Co., Cincinnati 9, O.

PLANT DISMANTLERS

Hetz Construction Co., Warren, O.

PLASTIC MOLDS (Hobbed)

Sossner Co., 161 Grand St., New York 13, N. Y.

PLATE CASTORS

Hyatt Bearings Div., General Motors Corp., Harrison, N. J.

PLATE PRESSING (Heavy)

Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Parish Pressed Steel Co., Reading, Pa.

PLATES (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Dow Chemical Co., The, Midland, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

PLATES (Sheared or Universal) (*Also Stainless)

*Alan Wood Steel Co., Conshohocken, Pa.
*Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
American Petrometal Corp., Broadway at 11th St., Long Island City 2, N. Y.
*American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Atlantic Steel Products Co., 1330 N. 30th St., Philadelphia 21, Pa.
Avondale Marine Ways, Inc., Westwego, La.
Benedict-Miller Inc., 216 Clifford St., Newark 5, N. J.
*Bethlehem Steel Co., Bethlehem, Pa.
*Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Columbia Steel Co., San Francisco 6, Calif.
Enterprise Galvanizing Co., Almond & E. Firth Sts., Philadelphia 25, Pa.
Granite City Steel Co., Granite City, Ill.
Holliday, W. J., & Co., Hammond, Ind.
*Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
*Republic Steel Corp., Dept. ST, Cleveland 4, O.
*Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
*United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Worth Steel Co., Claymont, Del.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

PLATES (Stainless Clad)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Granite City Steel Co., Granite City, Ill.
Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.

PLATES (Steel—Floor)—See FLOORING (Steel)

PLATES (Terne and Tin)—See TIN or TERNE PLATE

PLATING (Zinc and Cadmium)

Acme Plating Co., The, 1563 E. 21st St., Cleveland 14, O.

PLATING EQUIPMENT

Chicago Wheel & Mfg. Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Heil Engineering Co., 12903 Elmwood Ave., Cleveland 11, O.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

PLATING SUPPLIES

duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.
United Chromium, Inc., 51 E. 42nd St., New York 17, N. Y.

PLUGS (Expansion)

Hubbard. M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
Master Products Co., The, 6400 Park Ave., Cleveland 5, O.
Wrought Washer Mfg. Co., 2103 S. Bay St., Milwaukee 7, Wis.

POLE LINE MATERIAL

Bethlehem Steel Co., Bethlehem, Pa.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.

POLES (Tubular Steel)

National Tube Co., Frick Bldg., Pittsburgh 30, Pa.

PORTABLE TOOLS AND ACCESSORIES

Chicago Wheel & Manufacturing Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.

POTENTIOMETERS

Bristol Co., The, Waterbury 91, Conn.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.

POTS (Annealing-Wire)

National Annealing Box Co., Washington, Pa.

POTS (Case Hardening)

Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Rolock, Inc., 1380 Kings Highway, Fairfield, Conn.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

POTS (Melting)

Farrel-Birmingham Co., Inc., Ansonia, Conn.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore 2, Md.

POTS (Tinning)

National Annealing Box Co., Washington, Pa.

POWDERED METAL PRODUCTS

Metal Hydrides, Inc., 12-24 Congress St., Beverly, Mass.
Moraine Products Div., General Motors Corp., Dayton 1, O.

POWDERS, METAL (Iron, Lead, Brass & Copper)

New Jersey Zinc Co., 160 Front St., New York 7, N. Y.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

POWER PLANTS (Diesel, Gas Engine, Steam)

Ready-Power Co., The, 3842 Grand River Ave., Detroit 8, Mich.

POWER UNITS (Gasoline, Electric, for Industrial Trucks)

Ready-Power Co., The, 3842 Grand River Ave., Detroit 8, Mich.

PREHEATERS

Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Fostoria Pressed Steel Corp., The, Fostoria, O.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

PRESS ATTACHMENTS (Safety)

Covert Mfg. Co., Heyman Machine Div., Troy, N. Y.

PRESS BRAKES

Bliss, E. W., Co., 53rd St., & First Ave., Brooklyn 32, N. Y.
Cincinnati Shaper Co., The, Garrard and Elam Sts., Cincinnati 25, O.
Cleveland Crane & Engineering Co., The, Steelweld Machinery Div., The, 1125 E. 283rd St., Wickliffe, O.
Verson Allsteel Press Co., 1355 E. 93rd St., Chicago 19, Ill.

PRESSED METAL PARTS

American Brass Co., The, Waterbury 88, Conn.
Mullins Mfg. Co., Warren, O.
Parish Pressed Steel Co., Reading, Pa.
Pressed Metal Institute, Union Commerce Bldg., Cleveland 14, O.
Stanley Works, The, Pressed Metal Div., New Britain, Conn.
Worcester Pressed Steel Co., 512 Barber Ave., Worcester 6, Mass.

PRESSES

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Colonial Broach Co., P.O. Box No. 37, Harper Sta., Detroit 13, Mich.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Galland-Henning Manufacturing Co., 2747 S. 31st St., Milwaukee 7, Wis.
Hydraulic Press Mfg. Co., Mt. Gilead, O.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Streine Tool & Mfg. Co., The, New Bremen, O.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
Tomkins-Johnson Co., The, Dept. S, 611 N. Mechanic St., Jackson, Mich.
Verson Allsteel Press Co., 1355 E. 93rd St., Chicago 19, Ill.
Walsh Press & Die Co., Div. of American Machine & Gage Co., 4725 W. Kinzie St., Chicago 44, Ill.
Warren City Mfg. Co., Warren, O.

PRESSES (Bending)

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Bliss, E. W., Co., 53rd St., & First Ave., Brooklyn 32, N. Y.
Cleveland Crane & Engineering Co., The, Steelweld Machinery Div., The, 1125 E. 283rd St., Wickliffe, O.
Denison Engineering Co., The, 1163 Dublin Rd. Columbus 16, O.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Verson Allsteel Press Co., 1355 E. 93rd St., Chicago 19, Ill.
Walsh Press & Die Co., Div. of American Machine & Gage Co., 4725 W. Kinzie St., Chicago 44, Ill.
Zeh & Hahnemann Co., 56 Avenue A, Newark 5, N. J.

PRESSES (Extrusion)

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Bliss, E. W., Co., 53rd St., & First Ave., Brooklyn 32, N. Y.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.

PRESSES (Forging)

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Bigwood, Joshua, & Son Ltd., Wolverhampton, England

PRESSES (Forging) (Con.)

Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Bliss, E. W., Co., 53rd St., & First Ave., Brooklyn 32, N. Y.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Erie Foundry Co., Erie, Pa.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
National Machinery Co., The, Tiffin, O.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Verson Allsteel Co., 1355 E. 93rd St., Chicago 19, Ill.

PRESSES (Forming and Braking)

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Bliss, E. W., Co., 53rd St., & First Ave., Brooklyn 32, N. Y.
Cincinnati Shaper Co., The, Garrard and Elam Sts., Cincinnati 25, O.
Cleveland Crane & Engineering Co., The, Steelweld Machinery Div., The, 1125 E. 283rd St., Wickliffe, O.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Verson Allsteel Co., 1355 E. 93rd St., Chicago 19, Ill.
Zeh & Hahnemann Co., 56 Avenue A, Newark 5, N. J.

PRESSES (Hydraulic)

Air Hydraulics Div., Beyer Machine Co., Jackson, Mich.
Albert, L., & Son, Whitehead Rd., Trenton, N. J.
Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Bliss, E. W., Co., 53rd St., & First Ave., Brooklyn 32, N. Y.
Chambersburg Engineering Co., Chambersburg, Pa.
Colonial Broach Co., P.O. Box No 37, Harper Sta., Detroit 13, Mich.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Erie Foundry Co., Erie, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Galland-Henning Manufacturing Co., 2747 S. 31st St., Milwaukee 7, Wis.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Hydraulic Machinery, Inc., 12825 Ford Rd., Dearborn, Mich.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
National Erie Corp., Erie, Pa.
Progressive Welder Co., 30501 E. Outer Drive, Detroit 12, Mich.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
Verson Allsteel Co., 1355 E. 93rd St., Chicago 19, Ill.
Walsh Press & Die Co., Div. of American Machine & Gage Co., 4725 W. Kinzie St., Chicago 44, Ill.
Wood, R. D., Co., 400 Chestnut St., Philadelphia 5, Pa.
Wright Mfg. Div. of American Chain & Cable Co., Inc., York, Pa.

PRESSES (Pneumatic)

Air Hydraulics Div., Beyer Machine Co., Jackson, Mich.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Walsh Press & Die Co., Div. of American Machine & Gage Co., 4725 W. Kinzie St., Chicago 44, Ill.

PRESSES (Punching, Drawing, Coining, Blanking, etc.)

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Birdsboro Steel Fdry. & Machine Co., Birdsboro, Pa.
Bliss, E. W., Co., 53rd St., & First Ave., Brooklyn 32, N. Y.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.
Verson Allsteel Co., 1355 E. 93rd St., Chicago 19, Ill.
Walsh Press & Die Co., Div. of American Machine & Gage Co., 4725 W. Kinzie St., Chicago 44, Ill.
Zeh & Hahnemann Co., 56 Avenue A, Newark 5, N. J.

PRESSES (Riveting)

Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.

PRESSES (Stamping)

Bliss, E. W., Co., 53rd St., & First Ave., Brooklyn 32, N. Y.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Walsh Press & Die Co., Div. of American Machine & Gage Co., 4725 W. Kinzie St., Chicago 44, Ill.
Zeh & Hahnemann Co., 56 Avenue A, Newark 5, N. J.

PRESSES, BRIQUETTING (Hydraulic)

Baldwin Southwark Div., Baldwin Locomotive Works, The, Pascall P. O., Philadelphia 42, Pa.
Bliss, E. W., Co., 53rd St. & First Ave., Brooklyn 32, N. Y.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.

PRESSURE VESSELS

Babcock & Wilcox Co., 85 Liberty St., New York 6, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
National Annealing Box Co., Washington, Pa.
Scaife Co., Ann St., Oakmont, Pa.
Struthers Wells Corp., Titusville, Pa.

PROCESS ENGINEERING

Atlas Tool & Designing Co., Castor & Kensington Aves., Philadelphia 24, Pa.

PUG MILLS

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.

PULLEYS (Magnetic)

Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.

PULVERIZERS

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Pulverizer Co., 1539 Macklind Ave., St. Louis 10, Mo.
Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Gruendler Crusher & Pulverizer Co., 2915-17 N. Market St., St. Louis 6, Mo.
Vulcan Iron Works, Wilkes-Barre, Pa.

PUMPS

Aldrich Pump Co., The, 8 Pine St., Allentown, Pa.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Oil Well Supply Co., Dallas 1, Tex.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Roper, Geo. D., Corp., Rockford, Ill.
Weinman Pump & Supply Co., The, 207-209 Blvd. of the Allies, Pittsburgh 22, Pa.

PUMPS (Boiler Feed)

Aldrich Pump Co., The, 8 Pine St., Allentown, Pa.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
DeLaval Steam Turbine Co., Trenton 8, N. J.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

PUMPS (Centrifugal)

Aldrich Pump Co., The, 8 Pine St., Allentown, Pa.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
DeLaval Steam Turbine Co., Trenton 8, N. J.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Gray-Mills Co., 1948-52 Ridge Ave., Evanston, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Jaeger Machine Co., The, 550 W. Spring St., Columbus 15, O.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Schneible, Claude B., Co., 2827 25th St., Detroit 16, Mich.

PUMPS (Fuel Injection)

Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.

PUMPS (High Pressure)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
DeLaval Steam Turbine Co., Trenton 8, N. J.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Roper, Geo. D., Corp., Rockford, Ill.

PUMPS (Hydraulic)

Aldrich Pump Co., The, 8 Pine St., Allentown, Pa.
Baldwin Southwark Div., Baldwin Locomotive Works, The, Pascall P. O., Philadelphia 42, Pa.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
DeLaval Steam Turbine Co., Trenton 8, N. J.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Galland-Henning Manufacturing Co., 2747 S. 31st St., Milwaukee 7, Wis.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.
New York Air Brake Co., The, 420 Lexington Ave., New York 17, N. Y.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Roper, Geo. D., Corp., Rockford, Ill.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.
Vickers Inc., 1480 Oakman Blvd., Detroit 32, Mich.
Wood, R. D., Co., 400 Chestnut St., Philadelphia 5, Pa.

PUMPS (Lubricating)

Stewart-Warner Corp., Alemite Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.

PUMPS (Reciprocating)

Aldrich Pump Co., The, 8 Pine St., Allentown, Pa.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.

PUMPS (Rotary)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
DeLaval Steam Turbine Co., Trenton 8, N. J.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Roper, Geo. D., Corp., Rockford, Ill.
Vickers, Inc., 1480 Oakman Blvd., Detroit 32, Mich.

PUMPS (Vacuum)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Saunders, Alexander, & Co., 95 Bedford St., New York 14, N. Y.

PUMPS (Vertical Turbine)

DeLaval Steam Turbine Co., Trenton 8, N. J.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Layne & Bowler, Inc., Memphis 8, Tenn.

PUNCHES (Multiple)

Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Cincinnati Shaper Co., The, Garrand and Elam Sts., Cincinnati 25, O.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.

PUNCHES (Piercing, Interchangeable)

Allied Products Corp., 4646 Lawton St., Detroit 8, Mich.

PUNCHING AND SHEARING MACHINERY

Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Bliss, E. W., Co., 53rd St. & First Ave., Brooklyn 32, N. Y.
Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Chambersburg Engineering Co., Chambersburg, Pa.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Continental Foundry & Machine Co., E. Chicago, Ind.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Wean Engineering Co., Inc., The, Warren, O.

PURIFIERS (Oil)

Honan-Crane Corp., 210 S. Wabash Ave., Lebanon, Ind.

PYROMETER TUBES

Bristol Co., The, Waterbury 91, Conn.
Carborundum Co., The, Niagara Falls, N. Y.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Norton Company, Worcester 6, Mass.

PYROMETERS

Bristol Co., The, Waterbury 91, Conn.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.

RACKS & PINIONS

Industrial Gear Mfg. Co., 4545 W. Van Buren St., Chicago 24, Ill.

RAIL BREAKERS

United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.

RAILS (New and Relaying)

Dulien Steel Products, Inc., 1008 Western Ave., Seattle 4, Wash.
Foster, L. B., Co., Inc., P. O. Box 1647, Pittsburgh, Pa.
Midwest Steel Corp., Charleston, W. Va.
Sonken-Galamba Corp., 108 N. 2nd St., Kansas City, Kans.

RAILS (Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.

REAMERS

Barber-Colman Co., 150 Loomis St., Rockford, Ill.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland 14, O
Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Greenfield Tap & Die Corp., Greenfield, Mass.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Masterform Tool Co., 2532 Irving Park Blvd., Chicago 18, Ill.
National Automatic Tool Co., S. 7th & N Sts., Richmond, Ind.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

REAMERS (Carbide Tipped)

Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland 14, O.
Gisholt Machine Co., 1245 E. Washington St., Madison 3, Wis.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Spe-D-Cut Tool Co., Hannibal, Mo.

REBUILT EQUIPMENT

Albert, L., & Son, Whitehead Rd., Trenton, N. J.
General Blower Co., Morton Grove, Ill.
Iron & Steel Products, Inc., Hegewisch Sta., Chicago 33, Ill.
Simmons Machine Tool Corp., 1755 N. Broadway, Albany 1, N. Y.
West Penn Machinery Co., 1208 House Bldg., Pittsburgh, Pa

RECEIVERS

Scaife Co., Ann St., Oakmont, Pa.

RECORD FORMS

Remington-Rand Inc., Systems Div., 415 Fourth Ave., New York 10, N. Y.

RECORD KEEPING SYSTEMS

Remington-Rand Inc., Systems Div., 415 Fourth Ave., New York 10, N. Y.

RECORDERS (Combustion)

Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.

RECORDERS (Pressure, Speed, Temperature, Time)

Bristol Co., The, Waterbury 91, Conn.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.

RECTIFIERS (Dry Disc)

Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
General Electric Co., Bridgeport 2, Conn.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

RECTIFIERS (Mercury Arc)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
General Electric Co., Schenectady 5, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

REDUCTION GEARS

DeLaval Steam Turbine Co., Trenton 8, N. J.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
James, D. O., Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Link-Belt Co., 2045 W. Hunting Park Ave., Philadelphia 40, Pa.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
National Erie Corp., Erie, Pa.
Philadelphia Gear Works, Erie Ave. & G St., Philadelphia 34, Pa.
Stokerunit Corp., 4548 W. Mitchell St., Milwaukee 14, Wis.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Twin Disc Clutch Co., 1379 Racine Ave., Racine, Wis.
Warren City Mfg. Co., Warren, O.
Westinghouse Electric Corp., 200 McCandless Ave., Pittsburgh 1, Pa.

REELS (Automatic Centering)

Littell, F. J., Machine Co., 4165 N. Ravenswood Ave., Chicago 13, Ill.

REELS (Coiling & Pay-Off)

Parish Pressed Steel Co., Reading, Pa.
Paxson Machine Co., Benton Rd., Salem, O.

REFRACTORIES (Chrome)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

REFRACTORIES (Dolomite)

Basic Refractories, Inc., Hanna Bldg., Cleveland 15, O.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

REFRACTORIES (Fire Clay)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Electro Refractories & Alloys Corp Vars Bldg., Buffalo 2, N. Y.
Eureka Fire Brick Works, 1100 B. F. Jones Law Bldg., Pittsburgh 19, Pa.
Globe Brick Co., The, East Liverpool, O.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
National Fireproofing Corp., 202 E. Ohio St., Pittsburgh 12, Pa.
National Foundry Sand Co., 2970 W. Grand Blvd., Detroit 2, Mich.
Remmey, Richard C., Son Co., Hedley St. & Delaware River, Philadelphia 37, Pa.

REFRACTORIES (For High Frequency Furnaces)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Carborundum Co., The, Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Norton Co., Worcester 6, Mass.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.

REFRACTORIES (Forsterite)

Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

REFRACTORIES (High Alumina)

Carborundum Co., The, Niagara Falls, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

REFRACTORIES (Insulating)

Carborundum Co., The, Niagara Falls, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.

REFRACTORIES (Magnesia)

Basic Refractories, Inc., Hanna Bldg., Cleveland 15, O.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Norton Co., Worcester 6, Mass.

REFRACTORIES (Magnesite)

Basic Refractories, Inc., Hanna Bldg., Cleveland 15, O.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

REFRACTORIES (Plastic)

Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Basic Refractories, Inc., Hanna Bldg., Cleveland 15, O.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Remmey, Richard C., Son Co., Hedley St. & Delaware River, Philadelphia 37, Pa.

REFRACTORIES (Silica)

Carborundum Co., The, Niagara Falls, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.

REFRACTORIES (Silicon Carbide)

Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., The, Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Norton Co., Worcester 6, Mass.
Remmey, Richard C., Son Co., Hedley St. & Delaware River, Philadelphia 37, Pa.

REFRACTORY CEMENT AND CONCRETE

Atlas Lumnite Cement Co., Dept. S., Chrysler Bldg., New York 17, N. Y.
Babcock & Wilcox Co., The, Refractories Div., 85 Liberty St., New York 6, N. Y.
Carborundum Co., The, Niagara Falls, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Harbison-Walker Refractories Co., 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
National Fireproofing Corp., 202 E. Ohio St., Pittsburgh 12, Pa.
Norton Co., Worcester 6, Mass.
Remmey, Richard C., Son Co., Hedley St. & Delaware River, Philadelphia 37, Pa.

REFRIGERATION EQUIPMENT (Industrial)

Deepfreeze, Div. of Motor Products Corp., 2309-7 Davis St., N. Chicago, Ill.
General Electric Co., (Air Conditioning & Commercial Refrigeration Div., Sec. 4412), Bloomfield, N. J.
Gray-Mills Co., 1948-52 Ridge Ave., Evanston, Ill.

REGULATORS (Pressure)

Bristol Co., The, Waterbury 91, Conn.
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Square D Co., 6060 Rivard St., Detroit 11, Mich.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

REGULATORS (Temperature)

Bristol Co., The, Waterbury 91, Conn.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.

REGULATORS (Voltage)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
General Electric Co., Schenectady 5, N. Y.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

REGULATORS (Welding & Cutting)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Black Mfg. Co., 1416-1428 W. Baltimore St., Baltimore 23, Md.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

REINFORCEMENT FABRIC (Electric Welded)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

RELAYS (Magnetic)

Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Federal Electric Products Co., 50 Paris St., Newark 5, N. J.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.

RESISTORS (Alloy Grid or Wire Wound—Electric)

Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1211 St. Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
General Electric Co., Schenectady 5, N. Y.
Guyan Machinery Co., Logan, W. Va.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

RESISTORS (Graphite Disc)

Allen-Bradley Co., 1316 S. 2nd St., Milwaukee 4, Wis.

RESPIRATORS

Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

RHEOSTATS

Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cutler-Hammer, Inc., 1211 St. Paul Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.

RINGS (Aluminum, Brass, Bronze)

Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Shenango-Penn Mold Co., 457 W. Third St., Dover, O.

RINGS (Steel)

Cleveland Welding Co., The, W. 117th St. & Berea Rd., Cleveland 7, O.
Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
King Fifth Wheel Co., 2915 N. Second St., Philadelphia 33, Pa.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.

RINGS (Weldless) (*Also Stainless)

*Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
*Midvale Co., The, Nicetown, Philadelphia 40, Pa.

RIVETERS (Hydraulic—Portable and Stationary)

Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.

RIVETERS (Pneumatic)

Cleveland Pneumatic Tool Co., The, 3781 E. 77th St., Cleveland 5, O.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago 6, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.

RIVETING MACHINERY

Chambersburg Engineering Co., Chambersburg, Pa.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Tomkins-Johnson Co., The, Dept. S, 611 N. Mechanic St., Jackson, Mich.
Wood, R. D., Co., 400 Chestnut St., Philadelphia 5, Pa.

RIVETS (*Also Stainless)

Bethlehem Steel Co., Bethlehem, Pa.
*Camcar Products Co., Rockford, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh - Chicago
Champion Rivet Co., The, 11200 Harvard Ave., Cleveland 5, O.
*Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
Hassall, John, Inc., 402 Oakland St., Brooklyn 22, N. Y.
*Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
*National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
*Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
*Republic Steel Corp., Upson Nut Div., Dept. ST, 1912 Scranton Rd., Cleveland 13, O.
*Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Triplex Screw Co., The, 5841 Grant Ave., Cleveland 5, O.

RIVETS (Blind)

Clark Equipment Co., Buchanan, Mich.

RIVETS (Nonferrous)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Camcar Products Co., Rockford, Ill.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
*Hassall, John, Inc., 402 Oakland St., Brooklyn 22, N. Y.
Huck Mfg. Co., 2480 Bellevue Ave., Detroit 7, Mich.
Manufacturers Screw Products, 216 W. Hubbard St., Chicago 10, Ill.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

RODS (Alloy)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Ampco Metal Inc., Dept. S12, Milwaukee 4, Wis.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Copperweld Steel Co., Warren, O.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.

RODS (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Dow Chemical Co., The, Midland, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

RODS (Brass, Bronze, Phosphor Bronze, Silicon Bronze, Copper, Nickel Silver)

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
Revere Copper & Brass Co., Inc., 230 Park Ave., New York 17, N. Y.
Riverside Metal Co., Riverside, N. J.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Seymour Manufacturing Co., The, 51 Franklin St., Seymour, Conn.

RODS (Drill)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Anchor Drawn Steel Co., Latrobe, Pa.
Benedict-Miller Inc., 216 Clifford St., Newark 5, N. J.
Bissett Steel Co., The, 945 E. 67th St., Cleveland 8, O.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Sandvik Steel, Inc., 111 Eighth Ave., New York 11, N. Y.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

RODS (Iron and Steel)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Firth-Sterling Steel Co., McKeesport, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Roebling's, John A., Sons Co., Trenton 2, N. J.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

RODS (Rounds, Flats and Shapes) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
*American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Copperweld Steel Co., Warren, O.
*Firth-Sterling Steel Co., McKeesport, Pa.
*Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
*Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
*Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Lovinson Steel Sales Co., The, 38 Pride St., Pittsburgh 19, Pa.
*Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
*Republic Steel Corp., Dept. ST, Cleveland 4, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
*United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Washburn Wire Co., Phillipsdale, R. I.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

RODS (Threaded)

Benedict-Miller, Inc., 216 Clifford St., Newark 5, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
Central Screw Co., Chicago 9, Ill.
Continental Screw Co., New Bedford, Mass.
Manufacturers Screw Products, 331 W. Hubbard St., Chicago 10, Ill.
Milton Mfg. Co., The, Milton, Pa.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Republic Steel Corp., Upson Nut Div., Dept. ST., 1912 Scranton Rd., Cleveland 13, O.
Russell, Burdsall, & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.

RODS (Wire)—See WIRE PRODUCTS

ROLL FORMING MACHINES

Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Wean Engineering Co., Inc., The, Warren, O.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

ROLLER COATING

Japan Co., The, 5103 Lakeside Ave., Cleveland 14, O.

ROLL HEATERS—See HEATERS (Electric Roll)

ROLLING DOORS & SHUTTERS—See DOORS AND SHUTTERS

ROLLING MILL BEARINGS—See BEARINGS (Rolling Mill)

ROLLING MILL ENGINEERS (Consulting and Contracting)

Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.

ROLLING MILL EQUIPMENT

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Alliance Machine Co., The, Alliance, O.
Bigwood, Joshua, & Son Ltd., Wolverhampton, England
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Bliss, E. W., Co., 53rd St. & First Ave., Brooklyn 32, N. Y.
Cold Metal Products Co., The, 2131 Wilson Ave., Youngstown 1, O.
Continental Foundry & Machine Co., E. Chicago, Ind.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hallden Machine Co., The, Thomaston, Conn.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Morgan Construction Co., Worcester 5, Mass.
Morgan Engineering Co., The, Alliance, O.
Paxson Machine Co., Benton Rd., Salem, O.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Streine Tool & Mfg. Co., The, New Bremen, O.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Wean Engineering Co., Inc., The, Warren, O.

ROLLING MILL MACHINERY (Used)

Foster, Frank B., 829 Oliver Bldg., Pittsburgh, Pa.

ROLLING MILL TABLES AND ROLLERS

Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.

ROLLS (Bending and Straightening)

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Medart Co., The 3500 DeKalb St., St. Louis 18, Mo.
Wean Engineering Co., Inc., The, Warren, O.
Webb Corp., The, Webb City, Mo.

ROLLS (Crushing)

Vulcan Iron Works, Wilkes-Barre, Pa.

ROLLS (Iron and Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Continental Foundry & Machine Co., E. Chicago, Ind.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hyde Park Fdry. and Machine Co., Hyde Park, Pa.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Ohio Steel Foundry Co., Lima & Springfield, O.
Pittsburgh Rolls Div., Blaw-Knox Co., Pittsburgh 1, Pa.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.

ROLLS (Nonferrous)

National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Shenango-Penn Mold Co., 457 W. Third St., Dover, O.

ROLLS (Sand and Chilled)

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Continental Foundry & Machine Co., E. Chicago, Ind.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.

ROLLS (Sand and Chilled) (Con.)

Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Ohio Steel Foundry Co., Lima & Springfield, O.
Pittsburgh Rolls Div. of Blaw-Knox Co., Pittsburgh 1, Pa.
United Engineering & Fdry Co., First National Bank Bldg., Pittsburgh 22, Pa.

ROLLS (Tinning Machine)

American Shear Knife Co., P. O. Box 355, Homestead, Pa.
Wean Engineering Co., Inc., The, Warren, O.

ROOFING (Plastic and Liquid)

Koppers Co., Tar & Chemical Div., 300 Koppers Bldg., Pittsburgh 19, Pa.

ROOFING, SIDING & FLASHING

American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.

ROOFING AND SIDING (Corrugated and Plain)

American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Continental Steel Corp., Kokomo, Ind.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
New Jersey Zinc Co., 160 Front St., New York 7, N. Y.
Reliance Steel Corp. Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Sons, Inc., 16th and Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.

ROTARY CONVERTERS

Kato Engineering Co., Mankato, Minn.

RUBBER GOODS (Industrial)

Boston Woven Hose & Rubber Co., P.O. Box 1071, Boston 3, Mass
Gates Rubber Co., The, 999 S. Broadway, Denver 17, Colo.
Goodrich, B. F., Co., The, Akron 18, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

RUBBER LINING (Hard and Soft)

United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

RUST PREVENTIVES

American Chemical Paint Co., Ambler, Pa.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
International Rustproof Corp., 12507 -15 Plover Ave., Cleveland 7, O.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Koppers Co., Tar & Chemical Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.
Nox-Rust Corporation, 2463 S. Halsted St., Chicago 8, Ill.
Rheem Research Products Inc., 206 Standard Oil Bldg., Baltimore 2, Md.
Stewart-Warner Corp., Alemite Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.

RUST PROOFING PROCESSES AND EQUIPMENT

American Chemical Paint Co., Ambler, Pa.
Detrex Corporation, 13029 Hillview Ave., Detroit 4, Mich.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Enterprise Galvanizing Co., Almond & E. Firth Sts., Philadelphia 25, Pa.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
International Rustproof Corp., 12507 -15 Plover Ave., Cleveland 7, O.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Nox-Rust Corporation, 2463 S. Halsted St., Chicago 8, Ill.
Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Parker Rust Proof Co., 2158 E. Milwaukee Ave., Detroit 11, Mich.
Standard Steel Spring Co., Coraopolis, Pa.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.
Udylite Corp., The, 1651 E. Grand Blvd., Detroit 11, Mich.

SAFE ENDS (Boiler Tube)

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.

SAFETY DEVICES

Covert Mfg. Co., Heyman Machine Div., Troy, N. Y.

SAFETY DEVICES (Electric)

Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

SAFETY EQUIPMENT

Covert Mfg. Co., Heyman Machine Div., Troy, N. Y.
Hy-Test Div. International Shoe Co., 1509 Washington Ave., St. Louis 3, Mo.
Lehigh Safety Shoe Co., Inc., Allentown, Pa.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

SALT TABLETS

Morton Salt Co., 310 S. Michigan Ave., Chicago 4, Ill.

SAND BLAST EQUIPMENT

American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Federal Foundry Supply Co., The, 4600 E. 71st St., Cleveland 5, O.
Pangborn Corporation, Hagerstown, Md.
Willson Products, Inc., 2nd & Washington Sts., Reading, Pa.

SAND CONDITIONING AND PREPARING MACHINERY

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Link-Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

SAWING MACHINES (Contour)

DoAll Company, The, 231 N. Laurel Ave., Des Plaines, Ill.

SAWING MACHINES (Hack)

Armstrong-Blum Mfg. Co., 5700 Bloomingdale Ave., Chicago 39, Ill.

SAWING MACHINES (Hot and Cold)

Armstrong-Blum Mfg. Co., 5700 Bloomingdale Ave., Chicago 39, Ill.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Morgan Engineering Co., The, Alliance, O.
United Engineering & Fdry. Co., First National Bank Bldg., Pittsburgh 22, Pa.
Wells Mfg. Co., 1515 Fillmore St., Three Rivers, Mich.

SAWS (Band—Metal Cutting)

Armstrong-Blum Mfg. Co., 5700 Bloomingdale Ave., Chicago 39, Ill.
Disston, Henry, & Sons, Inc., 1126 Tacony, Philadelphia 35, Pa.
DoAll Co., The, 231 N. Laurel Ave., Des Plaines, Ill.
Huther Bros. Saw Mfg. Co., Inc., 1290 University Ave., Rochester, N. Y.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.
Wells Mfg. Co., 1515 Fillmore St., Three Rivers, Mich.

SAWS (Hack)

Armstrong-Blum Mfg. Co., 5700 Bloomingdale Ave., Chicago 39, Ill.
Disston, Henry, & Sons, Inc., 1126 Tacony, Philadelphia 35, Pa.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.

SAWS (Hot and Cold)

Huther Bros. Saw Mfg. Co., Inc., 1290 University Ave., Rochester, N. Y.

SAWS (Inserted Tooth, Cold)

Disston, Henry, & Sons, Inc., 1126 Tacony, Philadelphia 35, Pa.
Huther Bros. Saw Mfg. Co., Inc., 1290 University Ave., Rochester, N. Y.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.

SAWS (Metal Cutting)

Armstrong-Blum Mfg. Co., 5700 Bloomingdale Ave., Chicago 39, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Disston, Henry, & Sons, Inc., 1126 Tacony, Philadelphia 35, Pa.
DoAll Co., The, 231 N. Laurel Ave., Des Plaines, Ill.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.
Wells Mfg. Co., 1515 Fillmore St., Three Rivers, Mich.

SAWS (Segmental)

Disston, Henry, & Sons, Inc., 1126 Tacony, Philadelphia 35, Pa.
Simonds Saw & Steel Co., 1350 Columbia Rd. Boston 27, Mass.

SCALES

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.

SCALES (Dial & Recording)

Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.

SCALES (Laboratory)

Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.

SCALES (Monorail)

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.

SCALES (Steel Mill)

Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.

SCREENS (Vibrating)

Ajax Flexible Coupling Co., 4 English St., Westfield, N. Y.
Link-Belt Co., 2045 W. Hunting Park Ave., Philadelphia 40, Pa.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.

SCREENS AND SIEVES

Ajax Flexible Coupling Co., 4 English St., Westfield, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Chicago Perforating Co., 2443 W. 24th Pl., Chicago 8, Ill.
Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., 171 York St., Rochester 11, N. Y.
Harrington & King Perforating Co., The, 5634 Fillmore St., Chicago 44, Ill.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Koppers Co., Engineering & Construction Div., 300 Koppers Bldg., Pittsburgh 19, Pa.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

SCREW EXTRACTOR

Greenfield Tap & Die Corp., Greenfield, Mass.

SCREW MACHINE PRODUCTS

Allied Products Corp., 4646 Lawton St., Detroit 8, Mich.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Amon-Schulte Co., 321 Ohio River Blvd., Emsworth, Pittsburgh 2, Pa.
Basler, E. J., Co., 231 S. LaSalle St., Chicago 4, Ill.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Hindley Mfg. Co., Valley Falls, R. I.
Joyce Machine Co., Hatboro, Pa.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
New Britain Machine Co., New Britain, Conn.
Poulsen & Nardon, Inc., 2665 Leonis Blvd., Los Angeles 11, Cal.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.
Tourek, J. J., Mfg. Co., 1101-11 W. 16th St., Chicago 50, Ill.
U. S. Automatic Corp., Amherst, O.
Western Automatic Machine Screw Co., Elyria, O.

SCREW MACHINES (Automatic, Single and Multiple Spindle)

Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cleveland Automatic Machine Co., The, 2269 Ashland Rd., Cleveland 3, O.
Cone Automatic Machine Co., Inc., Windsor, Vt.
Greenlee Bros. & Co., 1927 Mason Ave., Rockford, Ill.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
New Britain Machine Co., New Britain, Conn.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.
Simmons Machine Tool Corp., 1755 N. Broadway, Albany 1, N. Y.

SCREW PLATES

Greenfield Tap & Die Corp., Greenfield, Mass.

SCREW STOCK—See STEEL (Screw Stock)

SCREWDRIVERS (Power)

Detroit Power Screwdriver Co., 2813 W. Fort St., Detroit 16, Mich.

SCREWS (Cap, Set, Safety-Set)

Allied Products Corp., 4646 Lawton St., Detroit 8, Mich.
Bristol Co., The, Waterbury 91, Conn.
Chandler Products Corp., Euclid 17, O.
Chicago Screw Company, The, 1026 S. Homan Ave., Chicago 24, Ill.
Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
Manufacturers Screw Products, 216 W. Hubbard St., Chicago 10, Ill.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.

SCREWS (Cap, Set, Safety-Set) (Con.)

Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.
Triplex Screw Co., 5341 Grant Ave., Cleveland 5, O.
U. S. Automatic Corp., Amherst, O.
Western Automatic Machine Screw Co., Elyria, O.

SCREWS (Cold Headed)

Allied Products Corp., 4646 Lawton St., Detroit 8, Mich.
American Screw Co., Providence 1, R. I.
Chandler Products Corp., Euclid 17, O.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Hassall, John, Inc., 402 Oakland St., Brooklyn 22, N. Y.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Western Automatic Machine Screw Co., Elyria, O.

SCREWS (Hardened Metallic Drive)

American Screw Co., Providence 1, R. I.
Lamson & Sessions Co., The, 1971 W 85th St., Cleveland 2, O.
Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.
U. S. Automatic Corp., Amherst, O.

SCREWS (Hardened Self-Tapping)

American Screw Co., Providence 1, R. I.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.

SCREWS (Lag)

Bethlehem Steel Co., Bethlehem, Pa.
Boss Bolt & Nut Co. Div. of The Lock Nut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
Buffalo Bolt Co., 101 East Ave., N. Tonawanda, N. Y.
Camcar Products Co., Rockford, Ill.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
Manufacturers Screw Products, 216 W. Hubbard St., Chicago 10, Ill.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Republic Steel Corp., Upson Nut Div., Dept. St., 1912 Scranton Rd., Cleveland 13, O.
Russell, Burdsall, & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.

SCREWS (Machine)

American Screw Co., Providence 1, R. I.
Camcar Products Co., Rockford, Ill.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Triplex Screw Co., 5341 Grant Ave., Cleveland 5, O.
U. S. Automatic Corp., Amherst, O.
Western Automatic Machine Screw Co., Elyria, O.

SCREWS (Machine, Recessed Head)

American Screw Co., Providence 1, R. I.
Bristol Co., The, Waterbury 91, Conn.
Central Screw Co., Chicago 9, Ill.
Chandler Products Corp., Euclid 17, O.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
International Screw Co., Detroit 4, Mich.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., 2440 E. 75th St., Cleveland 4, O.
New England Screw Co., Keene, N. H.
Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.
Pawtucket Screw Co., Pawtucket, R. I.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
U. S. Automatic Corp., Amherst, O.
Western Automatic Machine Screw Co., Elyria, O.

SCREWS (Nonferrous and Stainless)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Screw Co., Providence 1, R. I.
Camcar Products Co., Rockford, Ill.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Harper, H. M. Co., The, 2646 Fletcher St., Chicago 18, Ill.
Hassall, John, Inc., 402 Oakland St., Brooklyn 22, N. Y.
Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Tourek, J. J., Mfg. Co., 4701-11 W. 16th St., Chicago 50, Ill.

SCREWS (Sheet Metal, Recessed Head)

American Screw Co., Providence 1, R. I.
Bristol Co., The, Waterbury 91, Conn.
Central Screw Co., Chicago 9, Ill.
Chandler Products Corp., Euclid 17, O.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., 2440 E. 75th St., Cleveland 4, O.
Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Shakeproof Lock Washer Co., Chicago, Ill.

SCREWS (Socket, Cold Forged)

Allied Products Corp., 4646 Lawton St., Detroit 8, Mich.
Bristol Co., The, Waterbury 91, Conn.
Chicago Screw Co., The, 1026 S. Homan Ave., Chicago 24, Ill.
Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.

SCREWS (Thread Cutting)

American Screw Co., Providence 1, R. I.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.

SCREWS (Thumb)

National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

SCREWS (Valve Tappet)

Chandler Products Corp., Euclid 17, O.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
U. S. Automatic Corp., Amherst, O.

SCREWS (Wood, Recessed Head)

American Screw Co., Providence 1, R. I.
Bristol Co., The, Waterbury 91, Conn.
Chandler Products Co., Euclid 17, O.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
National Screw & Mfg. Co., 2440 E. 75th St., Cleveland 4, O.
Parker, Charles, Co., The, Meriden, Conn.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Co., Nashua, N. H.

SCRUBBERS (Gas or Air)—See GAS SCRUBBERS

SEALS (Oil and Grease)

Chicago Rawhide Mfg. Co., 1308 Elston Ave., Chicago 22, Ill.
Goodrich, B. F., Co., The, Akron 18, O.

SEALS (Shaft)

Crane Packing Co., 1879 Cuyler Ave., Chicago 13, Ill.
Moraine Products Div., General Motors Corp., Dayton 1, O.

SEAMLESS STEEL TUBING—See TUBING (Seamless Steel)

SECTIONS (Rolled Metal)

Brasco Mfg. Co., Harvey, Ill.

SEPARATORS (Magnetic)

Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Ohio Electric Mfg. Co., The, 5906 Maurice Ave., Cleveland 4, O

SHACKLES

Bethlehem Steel Co., Bethlehem, Pa.

SHAFT HANGERS—See HANGERS

SHAFTING

American Brass Co., The, Waterbury 88, Conn.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Bissett Steel Co., The, 945 E. 67th St., Cleveland 8, O.
Bliss & Laughlin, Inc., Harvey, Ill.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg. Pittsburgh 30, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Union Drawn Steel Div., Republic Steel Corp., Massillon, O.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wyckoff Steel Co., P. O. Box 1256, Pittsburgh 30, Pa.

SHAFTING (Flexible)

Mall Tool Co., 7774 S. Chicago Ave. Chicago 19, Ill.
Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.

SHAPER-PLANERS

Rockford Machine Tool Co., 2400 Kishwaukee St., Rockford, Ill.

SHAPERS

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Cincinnati Shaper Co., The, Garrard and Elam Sts., Cincinnati 25, O.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
General Engineering & Mfg. Co., 1523 S. 10th St., St. Louis 4, Mo.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa
Ohio Machine Tool Co., The, Kenton, O.
Rockford Machine Tool Co., 2400 Kishwaukee St., Rockford, Ill.
Simmons Machine Tool Corp., 1755 N. Broadway, Albany 1, N. Y.

SHAPERS (Spindle)

Walker-Turner Co., Inc., 50123 Berckman St., Plainfield, N. J.

SHAPES (Deep Drawn)

Bethlehem Steel Co., Bethlehem, Pa.
Legion Utensils Corp., 40th Ave. & 21st St., Long Island City 1, N. Y.

SHAPES (Ferrous)

Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Brasco Mfg. Co., Harvey, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Milton Mfg. Co., The, Milton, Pa.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Union Drawn Steel Div., Republic Steel Corp., Massillon, O.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wyckoff Steel Co., P. O. Box 1256 Pittsburgh 22, Pa.

SHAPES (Non-Ferrous)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Brasco Mfg. Co., Harvey, Ill.
Dow Chemical Co., The, Midland, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville, Ky.

SHARPENING MACHINES (Hob, Cutter & Reamer)

Barber-Colman Co., 150 Loomis St., Rockford, Ill.

SHEAR BLADES

American Shear Knife Co., P. O. Box 355, Homestead, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Disston, Henry, & Sons, Inc., 1126 Tacony, Philadelphia 35, Pa.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.
Wapakoneta Machine Co., The, Wapakoneta, O.

SHEARS

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Beatty Machine & Mfg. Co., 150th & Oak Sts., Hammond, Ind.
Bigwood, Joshua, & Son Ltd., Wolverhampton, England
Buffalo Forge Co., 156 Mortimer St., Buffalo 5, N. Y.
Cincinnati Shaper Co., The, Garrard and Elam Sts., Cincinnati 25, O.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Continental Foundry & Machine Co., E. Chicago, Ind.
Hallden Machine Co. The, Thomaston, Conn.
Hyde Park Fdy. & Mach. Co., Hyde Park, Pa.
Lewis Fdry. & Mach. Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Morgan Engineering Co., The, Alliance, O.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
O'Neil-Irwin Mfg. Co., 304 8th Ave. S., Minneapolis 15, Minn.

SHEARS (Con.)

Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Streine Tool & Mfg. Co., The New Bremen, O.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
United Engineering & Fdry Co., First National Bank Bldg., Pittsburgh 22, Pa.

SHEARS (Tube & Pipe)

Pratt-Roop Co., Louisville, Ky.

SHEARS, ROTARY (Slitting, Beveling, Circling, Flanging)

Bigwood, Joshua, & Son Ltd., Wolverhampton, England
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Paxson Machine Co., Benton Rd., Salem, O.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.
Wapakoneta Machine Co., The, Wapakoneta, O.
Wean Engineering Co., Inc., The Warren, O.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

SHEET BARS

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept ST. Cleveland 4, O.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.

SHEET LIFTERS AND CARRIERS

American MonoRail Co., The, 18102 Athens Ave., Cleveland 7, O.
Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.
Hyde Park Fdy. & Mach. Co., Hyde Park, Pa.
Mansaver Division, 3101 East St., New Haven 3, Conn.
Merrill Brothers, 56-04 Arnold Ave. Maspeth, N. Y.

SHEET METAL PRODUCTS—See STAMPINGS

SHEET METAL WORKERS MACHINES

Cincinnati Shaper Co., The, Garrard and Elam Sts., Cincinnati 25, O.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Streine Tool & Mfg. Co., The New Bremen, O.

SHEET STEEL PILING (New and Used)

American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Caine Steel Co., 1820 N. Central Ave., Chicago 39, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Foster, L. B., Co., Inc., P. O. Box 1647, Pittsburgh, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill

SHEETS (Acid Resisting)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Haynes Stellite Co., Harrison & Lindsay Sts., Kokomo, Ind.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill

SHEETS (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Dow Chemical Co., The, Midland, Mich.
Reliance Steel Corp. Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

SHEETS (Black)

Alan Wood Steel Co., Conshohocken, Pa.
American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Caine Steel Co., 1820 N. Central Ave., Chicago 39, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh - Chicago
Columbia Steel Co., San Francisco 6, Calif.
Continental Steel Corp., Kokomo, Ind.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Granite City Steel Co., Granite City, Ill.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Reliance Steel Corp. Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Superior Sheet Steel Div., Continental Steel Corp., Canton, O.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

SHEETS (Brass, Bronze, Phosphor Bronze, Silicon Bronze, Copper, Nickel, Nickel Silver)

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Revere Copper & Brass Co., Inc., 230 Park Ave., New York 17, N. Y.
Riverside Metal Co., Riverside, N. J.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Seymour Manufacturing Co., The, 51 Franklin St., Seymour, Conn.
Western Brass Mills, Div. of Olin Industries, East Alton, Ill.

SHEETS (Corrugated)

American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Apollo Steel Co., 2243-2244 Oliver Bldg., Pittsburgh 22, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Continental Steel Corp., Kokomo, Ind.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg. Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.

SHEETS (Deep Drawing and Stamping)

Alan Wood Steel Co., Conshohocken, Pa.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Petrometal Corp., Broadway at 11th St., Long Island City 2, N. Y.
American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Apollo Steel Co., 2243-2244 Oliver Bldg., Pittsburgh 22, Pa.
Bethlehem Steel Co., Bethlehem, Pa
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Granite City Steel Co., Granite City, Ill.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Reliance Steel Corp. Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
United States Steel Supply Co., P. O Box M M, Chicago 90. Ill.
Ward Steel Co., 44 Farnsworth St., Boston 10, Mass.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Youngstown Sheet & Tube Co., The Youngstown 1, O.

SHEETS (Electrical)

Allegheny Ludlum Steel Corp. Dept. S-47, Brackenridge, Pa.
American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa
Granite City Steel Co., Granite City, Ill.
Ingersoll Steel & Disc. Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80. Ill.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

SHEETS (Electrolytic Zinc Coated)

American Nickeloid Co., 1310 Second St., Peru, Ill.
American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Weirton Steel Co., Weirton, W. Va

SHEETS (Enameling)

American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Follansbee Steel Corp. Third & Liberty Sts., Pittsburgh 30, Pa.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.

SHEETS (Galvanized)

American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Apollo Steel Co., 2243-2244 Oliver Bldg., Pittsburgh 22, Pa.
Bethlehem Steel Co., Bethlehem, Pa
Caine Steel Co., 1820 N. Central Ave., Chicago 39, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Continental Steel Corp., Kokomo, Ind.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Reliance Steel Corp. Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Superior Sheet Steel Div., Continental Steel Corp., Canton, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.

SHEETS (High Finished)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Apollo Steel Co., 2243-2244 Oliver Bldg., Pittsburgh 22 Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg. Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
United States Steel Supply Co., P. O. Box M M, Chicago 90. Ill.
Ward Steel Co., 44 Farnsworth St., Boston 10, Mass.
Weirton Steel Co., Weirton, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

SHEETS (Hot Rolled and Hot Rolled, Pickled and Annealed)

Alan Wood Steel Co., Conshohocken, Pa.
American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Apollo Steel Co., 2243-2244 Oliver Bldg., Pittsburgh 22, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Caine Steel Co., 1820 N. Central Ave., Chicago 39, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Continental Steel Corp., Kokomo, Ind.
Disston, Henry, & Sons, Inc. 1126 Tacony, Philadelphia 35, Pa.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Granite City Steel Co., Granite City, Ill.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg. Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Reliance Steel Corp. Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Worth Steel Co., Claymont, Del.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

SHEETS (Lead or Lead Alloy Coated)

American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Continental Steel Corp., Kokomo, Ind.
National Lead Co., 111 Broadway, New York 6, N. Y.

SHEETS (Lead or Lead Alloy Coated) (Con.)

Superior Sheet Steel Div., Continental Steel Corp., Canton, O.
Weirton Steel Co., Weirton, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.

SHEETS (Long Terne)

American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Caine Steel Co., 1820 N. Central Ave., Chicago 39, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Continental Steel Corp., Kokomo, Ind.
Reliance Steel Corp. Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Superior Sheet Steel Div., Continental Steel Corp., Canton, O.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

SHEETS (Perforated)

Diamond Mfg. Co., Wyoming, Pa.
Harrington & King Perforating Co., The, 5634 Fillmore St., Chicago 44, Ill.

SHEETS (Porous)

Moraine Products Div., General Motors Corp., Dayton 1, O.

SHEETS (Roofing)—See ROOFING AND SIDING (Corrugated and Plain)

SHEETS (Stainless)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Columbia Steel Co., San Francisco 6, Calif.
Eastern Stainless Steel Co., 122 Rolling Mill Ave., Baltimore 3, Md.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Republic Steel Corp., Massillon, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.

SHEETS (Stainless Clad)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Granite City Steel Co., Granite City, Ill.
Ave., Chicago 4, Ill.
Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Jessop Steel Co., 584 Green St., Washington, Pa.

SHEETS (Tin)—See TIN or TERNE PLATE

SHEETS (Tin Mill Black)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

SHELLS (Seamless Drawn)

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.

SHIMS (Laminated

Laminated Shim Co., Inc., 87 Union St., Glenbrook, Conn.

SHOES

Hy-Test Div. International Shoe Co., 1509 Washington Ave., St. Louis 3, Mo.
Lehigh Safety Shoe Co., Inc., Allentown, Pa.

SHOES (Foundry)

Hy-Test Div. International Shoe Co., 1509 Washington Ave., St. Louis 3, Mo.
Lehigh Safety Shoe Co., Inc., Allentown, Pa.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

SHOES (Safety)

Hy-Test Div. International Shoe Co., 1509 Washington Ave., St. Louis 3, Mo.
Lehigh Safety Shoe Co., Inc., Allentown, Pa.

SHOOK (Crate & Box)

Rathborne, Hair & Ridgway Co., 1440 W. 21st Place, Chicago 8, Ill.

SHOT (Peening)

American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Cleveland Metal Abrasive Co., The, 880 E. 67th St., Cleveland 8, O.
National Foundry Sand Co., 2970 W. Grand Blvd., Detroit 2, Mich.

SHOT AND GRIT

Alloy Metal Abrasive Co., 311 W. Huron St., Ann Arbor, Mich.
American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
General Abrasive Co., Inc., College Ave. & Hyde Park Blvd., Niagara Falls, N. Y.
National Foundry Sand Co., 2970 W. Grand Blvd., Detroit 2, Mich.
Pangborn Corporation, Hagerstown, Md.
Pittsburgh Crushed Steel Co., 4839 Harrison St., Pittsburgh 1, Pa.

SHOT BLASTING

American Foundry Equipment Co., 509 S. Byrkit St., Mishawaka, Ind.
Perfection Tool & Metal Heat Treating Co., 1740-58 W. Hubbard St., Chicago 22, Ill.

SHOVELS (Power)

Northwest Engineering Co., 28 E. Jackson Blvd., Chicago 4, Ill.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago 5, Ill.
Thew Shovel Co., The, Lorain, O.

SHOVELS, SPADES, SCOOPS (Hand)

Wood Shovel & Tool Co., Piqua, O.

SHRINKING EQUIPMENT (Metal)

Deepfreeze, Div. of Motor Products Corp., 2309-7 Davis St., N. Chicago, Ill.

SIEVES—See SCREENS AND SIEVES

SIGNS (Metal)

Webb Corp., The, Webb City, Mo.

SILICO-MANGANESE

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Ohio Ferro Alloys Corp., Citizens Bldg., Canton 2, O.
Samuel, Frank & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

SILICON BRONZE

American Brass Co., The, Waterbury 88, Conn.
Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Bridgeport Brass Co., Bridgeport 2, Conn.

SILICON METAL AND ALLOYS

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Keokuk Electro-Metals Co., Keokuk, Ia.
Miller & Co., 332 S. Michigan Ave., Chicago 4, Ill.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N.Y.
Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

SILICONES (Compounds, Fluids, Greases, Insulating Varnishes, Resins, Rubber)

Dow Corning Corp., P. O. Box 592, Midland, Mich.

SILK SCREENING

Japan Co., The, 5103 Lakeside Ave., Cleveland 14, O.

SKELP (Steel)

Alan Wood Steel Co., Conshohocken, Pa.
Bethlehem Steel Co., Bethlehem, Pa
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.

SKIP HOISTS (Materials Handling)

Bartlett, C. O., & Snow Co., The, 6200 Harvard Ave., Cleveland 5, O.
Dempster Brothers, Inc., 294 Shea Rd., Knoxville 17, Tenn.

SLAG GRANULATING MACHINES (Blast Furnace & Open Hearth)

Brosius, Edgar E., Co., Sharpsburg P. O., Pittsburgh 15, Pa.

SLEEVES (Cylinder)

McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.

SLEEVES (Pipe, Pipe Repair)

Dresser Manufacturing Div., Dresser Industries, Bradford, Pa.

SLEEVES (Piston, Pump & Shaft)

Shenango-Penn Mold Co., 457 W. Third St., Dover, O.

SLEEVES AND EXTENSION SOCKETS

Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

SLITTERS

Bethlehem Steel Co., Bethlehem, Pa.
Bliss, E. W., Co., 53rd St. & First Ave., Brooklyn 32, N. Y.
Cowles Tool Co., 2086 W. 110th St. Cleveland 2, O.
Paxson Machine Co., Benton Rd., Salem, O.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.
Wapakoneta Machine Co., The, Wapakoneta, O.
Wean Engineering Co., Inc., The, Warren, O.
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

SLOTTERS

Consolidated Machine Tool Corp., 565 Blossom Road, Rochester 10, N. Y.
Rockford Machine Tool Co., 2400 Kishwaukee St., Rockford, Ill.

SMALL TOOLS

Barber-Colman Co., 150 Loomis St., Rockford, Ill.
Bokum Tool Co., 14775 Wildemere Ave. Detroit 21, Mich.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland 14, O.
Woodworth, N. A., Co., 1300 E. Nine Mile Rd., Detroit 20, Mich.

SOAKING PITS

Amsler-Morton Co., The, Div. of Union Mining Co., Fulton Bldg., Pittsburgh 22, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Salem Engineering Co., 714 S. Broadway, Salem, O
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.

SOLDER

Bohn Aluminum & Brass Corp., Lafayette Bldg., Detroit 26, Mich.
Kester Solder Co., 4222 Wrightwood Ave., Chicago 39, Ill.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
National Lead Co., 111 Broadway New York 6, N. Y.

SOLDER (Silver)

Handy & Harman, 82 Fulton St., New York 7, N. Y.

SOLDERING EQUIPMENT

Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
Holden, A. F., Co., The, P.O. Box 1898, New Haven 8, Conn.
Lepel High Frequency Laboratories Inc., 39 W. 60th St., New York 23, N. Y.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

SOLENOIDS (Electric)

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
Cntler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
General Electric Co., Schenectady 5, N. Y.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.

SOLVENT (Degreasing)

Detrex Corporation, 13029 Hillview Ave., Detroit 4, Mich.
duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.
Gray-Mills Co., 1948-52 Ridge Ave., Evanston, Ill.
Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.
Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Pennsylvania Salt Mfg. Co., Dept. S. Pennsalt Cleaner Div., Philadelphia 7, Pa.

SPECIAL MACHINERY—See MACHINERY (Special)

SPEED REDUCERS

Atlantic Gear Works, 200 Lafayette St., New York 12, N. Y.
Cleveland Worm & Gear Co., The, 3270 E. 80th St., Cleveland 4, O.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Foote, Brad Gear Works, 1309 S. Cicero Ave., Cicero 50, Ill.
Grant Gear Works, 2nd & B Sts., Boston 27, Mass.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
James, D. O., Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Jones, W. A., Fdry. & Mach. Co., 4437 Roosevelt Rd., Chicago 24, Ill.
Link-Belt Co., 2045 W. Hunting Park Ave., Philadelphia 40, Pa.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Ottumwa Iron Works, Ottumwa, Ia.
Philadelphia Gear Works, Erie Ave. & G St., Philadelphia 34, Pa.
Silent Hoist & Crane Co., 849 68rd St., Brooklyn 20, N. Y.
Twin Disc Clutch Co., 1379 Racine Ave., Racine, Wis.
Westinghouse Electric Corp., 200 McCandless Ave., Pittsburgh 1, Pa.

SPIEGELEISEN

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
New Jersey Zinc Co., 160 Front St., New York 7, N. Y.
Samuel, Frank & Co., Inc., Harrison Bldg., Philadelphia 2, Pa.

SPIKES (Screw)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Republic Steel Corp., Dept ST, Cleveland 4, O.

SPINDLES (Grinding)

Bryant Chucking Grinder Co., 257 Clinton St., Springfield, Vt.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Heald Machine Co., The, Worcester 6, Mass.

SPLICE BARS (Rail)

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.

SPRAY BOOTHS

Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.

SPRAY GUN APPARATUS (Syphon and Pressure)

Black Mfg. Co., 1416-1428 W. Baltimore St., Baltimore 23, Md.

SPRINGS (*Also Stainless)

Accurate Spring Mfg. Co., 3823 W. Lake St., Chicago 24, Ill.
*American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
*Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
*Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Muehlhausen Spring Corp., 921 Michigan Ave., Logansport, Ind.
*Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N.Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

SPRINGS (Coil & Elliptic)

Accurate Spring Mfg. Co., 3823 W. Lake St., Chicago 24, Ill.
Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

SPRINGS (Compression)

*Accurate Spring Mfg. Co., 3823 W. Lake St., Chicago 24, Ill.
Amerian Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Barnes, Wallace, Co., The, Div. Associated Spring Corp. 97 Main St., Bristol, Conn.
Muehlhausen Spring Corp., 921 Michigan Ave., Logansport, Ind.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

SPRINGS (Flat Coiled)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Muehlhausen Spring Corp., 921 Michigan Ave., Logansport, Ind.
Washburn Wire Co., 118th & Harlem River, New York 35, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

SPRINGS (Oil Tempered—Flat)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Davis Brake Beam Co., Laurel Ave., & P. R. R., Johnstown, Pa.
Muehlhausen Spring Corp., 921 Michigan Ave., Logansport, Ind.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Standard Steel Spring Co., Coraopolis, Pa.
Standard Steel Spring Co., New Castle, Pa.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

SPRINGS (Torsion)

Accurate Spring Mfg. Co., 3823 W. Lake St., Chicago 24, Ill.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Muehlhausen Spring Corp., 921 Michigan Ave., Logansport, Ind.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.

SPRINKLERS (Automatic)

Blaw-Knox Sprinkler Div., Blaw-Knox Co., Blawnox, Pa.

SPROCKETS

Industrial Gear Mfg. Co., 4545 W. Van Buren St. Chicago 24, Ill.
Link-Belt Co., 220 S. Belmont Ave., Indianapolis 6, Ind.
Union Chain & Mfg. Co., Sandusky, O.

SPRUE CUTTERS

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.

STABILIZING EQUIPMENT (Temperature)

Deepfreeze, Div. of Motor Products Corp., 2309-7 Davis St., N. Chicago, Ill.

STACKS (Steel)—See BRIDGES, ETC.

STAINLESS STEEL—See listings marked "*" under individual product headings.

STAMPINGS

Ace Mfg. Corp., 1211 E. Erie Ave., Philadelphia 24, Pa.
Accurate Spring Mfg. Co., 3823 W. Lake St., Chicago 24, Ill.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Tube & Stamping Plant, (Stanley Wks.), Bridgeport 7, Conn.
Atlas Metal Stamping Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Barnes, Wallace, Co., The, Div. Associated Spring Corp. 97 Main St., Bristol, Conn.
Covert Mfg. Co., Heyman Machine Div., Troy, N. Y.
Davis Brake Beam Co., Laurel Ave. & P. R. R., Johnstown, Pa.
Erdle Perforating Co., 171 York St., Rochester 11, N. Y.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Homestead Valve Mfg. Co., P. O. Box 22, Coraopolis, Pa.
Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
Legion Utensils Corp., 40th Ave. & 21st St., Long Island City 1, N. Y.
Master Products Co., The, 6400 Park Ave., Cleveland 5, O.
Mullins Mfg. Co., Inc., Warren, O.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.
Parish Pressed Steel Co., Reading, Pa.
Poulsen & Nardon, Inc., 2665 Leonis Blvd., Los Angeles 11, Cal.
Pressed Metal Institute, Union Commerce Bldg., Cleveland 14, O.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Rheem Research Products, Inc., 206 Standard Oil Bldg., Baltimore 2, Md.
Scaife Co., Ann St., Oakmont, Pa.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Stanley Works, The, New Britain & Bridgeport, Conn.
Toledo Stamping & Mfg. Co., 90 Fearing Blvd., Toledo 7, O.
Veeder-Root, Inc., Hartford 2, Conn.
Wagner, E. R., Mfg. Co., 4615 N. 32nd St., Milwaukee 9, Wis.
Whitehead Stamping Co., 1667 W. Lafayette Blvd., Detroit 16, Mich.
Worcester Pressed Steel Co., 512 Barber Ave., Worcester 6, Mass.
Wrought Washer Mfg. Co., 2108 S. Bay St., Milwaukee 7, Wis.

STAMPS (Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Cunningham, M. E. Co., 172 E. Carson St., Pittsburgh 19, Pa.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.
Sossner Co., 161 Grand St., New York 13, N. Y.

STAPLES (Wire)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria 7, Ill.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg. Birmingham 2, Ala.
Wickwire Brothers, 189 Main St., Cortland, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

STARTERS (Electric Motor)

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Clark Controller Co., The, 1146 E. 152nd St., Cleveland 10, O.
Cntler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 East 79th St., Cleveland 4, O.
Federal Electric Products Co., 50 Paris St., Newark 5, N. J.
General Electric Co., Schenectady 5, N. Y.
Square D. Co., 4041 N. Richards St., Milwaukee 12, Wis.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

STEEL (Alloy)

Alan Wood Steel Co., Conshohocken, Pa.
Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
American Petrometal Corp., Broadway at 11th St., Long Island City 2, N. Y.
American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Anchor Drawn Steel Co., Latrobe, Pa.
Avondale Marine Ways, Inc., Westwego, La.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Colonial Steel Div., Vanadium-Alloys Steel Co., Grant Bldg., Pittsburgh 19, Pa.
Columbia Steel Co., San Francisco 6, Calif.
Copperweld Steel Co., Warren, O.
Disston, Henry, & Sons, Inc. 1126 Tacony, Philadelphia 35, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Frasse, Peter A., and Co., Inc., 17 Grand St., New York 13, N. Y.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Harrisburg Steel Corp., Harrisburg, Pa.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.
Jessop Steel Co., 584 Green St. Washington, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston, Mass.
SKF Steels, Inc., 420 Lexington Ave., New York 17, N. Y.
Stanley Works, The, New Britain & Bridgeport, Conn.
Superior Steel Corp., Carnegie, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Washburn Wire Co., Phillipsdale, R. I.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Youngstown Sheet & Tube Co., The Youngstown 1, O.
Ziv Steel & Wire Co., 2945 W. Harrison St., Chicago 12, Ill.

STEEL (Alloy—Abrasive, Corrosion & Heat Resistant)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
American Cast Iron Pipe Co., 2030 N. 16th St., Birmingham 2, Ala.
American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Bissett Steel Co., The, 945 E. 67th St., Cleveland 8, O.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Frasse, Peter A., and Co., Inc., 17 Grand St., New York 13, N. Y.
Granite City Steel Co., Granite City, Ill.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
International Nickel Co., Inc., The 67 Wall St., New York 5, N. Y.
Jessop Steel Co., 584 Green St., Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Michiana Products Corp., Michigan City, Ind.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Roebling's John A., Sons Co., Trenton 2, N. J.
Rustless Iron & Steel Corp., 3400 E. Chase St., Baltimore 13, Md.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Sharon Steel Corp., Sharon, Pa.
Standard Steel Spring Co., Coraopolis, Pa.
Stanley Works, The, New Britain & Bridgeport, Conn.
Superior Steel Corp., Carnegie, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.

STEEL (Alloy—Cold Finished)

American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Benedict-Miller Inc., 216 Clifford St., Newark 5, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Copperweld Steel Co., Warren, O.
Craine-Schrage Steel Co., 1025 W. Oakwood Ave., Detroit 25, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.

STEEL (Alloy—Cold Finished) (Con.)

Jessop Steel Co., 584 Green St., Washington, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Union Drawn Steel Div., of Republic Steel Corp., Massillon, O.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wyckoff Steel Co., P. O. Box 1256, Pittsburgh 30, Pa.

STEEL (Clad—Corrosion Resisting) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
*Copperweld Steel Co., Warren, O.
*Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
*Granite City Steel Co., Granite City, Ill.
*Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
Superior Steel Corp., Carnegie, Pa.

STEEL (Cold Finished)

American Petrometal Corp., Broadway at 11th St., Long Island City 2, N. Y.
American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem Pa.
Bissett Steel Co., The, 945 E. 67th Cleveland 8, O.
Bliss & Laughlin, Inc., Harvey, Ill.
Craine-Schrage Steel Co., 1025 W. Oakwood Ave., Detroit 25, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Frasse, Peter A., & Co., Inc. 17 Grand St., New York 13, N. Y.
General Steel Warehouse Co., Inc. 1830 N. Kostner Ave., Chicago 39, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Roebling's, John A., Sons Co., Trenton, N. J.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
SKF Steels, Inc., 420 Lexington Ave., New York 17, N. Y.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Union Drawn Steel Div. of Republic Steel Corp., Massillon, O.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Ward Steel Co., 44 Farnsworth St., Boston 10, Mass.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wyckoff Steel Co., P. O. Box 1256, Pittsburgh 22, Pa.
Ziv Steel & Wire Co., 2945 W. Harrison St., Chicago 12, Ill.

STEEL (Die)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Anchor Drawn Steel Co., Latrobe, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Colonial Steel Div., Vanadium-Alloys Steel Co., Grant Bldg., Pittsburgh 19, Pa.
Darwin & Milner, Inc., 1260 W. 4th St., Cleveland 13, O.
Disston, Henry, & Sons, Inc., 1126 Tacony, Philadelphia 35, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Jessop Steel Co., 584 Green St., Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Ziv Steel & Wire Co., 2945 W. Harrison St., Chicago 12, Ill.

STEEL (High Speed or Carbon Tool)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Anchor Drawn Steel Co., Latrobe, Pa.
Benedict-Miller, Inc., 216 Clifford St., Newark 5, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
Bissett Steel Co., The, 947 E. 67th St., Cleveland 8, O.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Colonial Steel Div., Vanadium-Alloys Steel Co., Grant Bldg., Pittsburgh 19, Pa.
Copperweld Steel Co., Warren, O.
Craine-Schrage Steel Co., 1025 W. Oakwood Ave., Detroit 25, Mich.
Darwin & Milner, Inc., 1260 W. 4th St., Cleveland 13, O.
Disston, Henry & Sons, Inc., 1126 Tacony, Philadelphia 35, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Holliday, W. J., & Co., Hammond, Ind.
Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
National Broach & Mach. Co., 5600 St. Jean Ave., Detroit 13, Mich.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Sandvik Steel, Inc., 111 Eighth Ave., New York 11, N. Y.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Ziv Steel & Wire Co., 2945 W. Harrison St., Chicago 12, Ill.

STEEL (High Tensile, Low Alloy)

Alan Wood Steel Co., Conshohocken, Pa.
American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Cold Metal Products Co., The, 2131 Wilson Ave., Youngstown 1, O.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Holliday, W. J., & Co., Hammond, Ind.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

STEEL (Nitrided)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.

STEEL (Screw Stock)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Bliss & Laughlin, Inc., Harvey, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Craine-Schrage Steel Co., 1025 W. Oakwood Ave., Detroit 25, Mich.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Holliday, W. J., & Co., Hammond, Ind.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Union Drawn Steel Div. of Republic Steel Corp., Massillon, O.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Ward Steel Co., 44 Farnsworth St., Boston 10, Mass.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wyckoff Steel Co., P. O. Box 1256, Pittsburgh 30, Pa.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

STEEL (Specialties)

Jessop Steel Co., 584 Green St., Washington, Pa.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.

STEEL (Spring)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Bethlehem Steel Co., Bethlehem, Pa.
Bissett Steel Co., The, 945 E. 67th St., Cleveland 8, O.
Cold Metal Products Co., The, 2131 Wilson Ave., Youngstown 1, O.
General Steel Warehouse Co., Inc. 1830 N. Kostner Ave., Chicago 39, Ill.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Sandvik Steel Inc., 111 Eighth Ave., New York 11, N. Y.
Thomas Steel Co., The, Warren, O.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Ward Steel Co., 44 Farnsworth St., Boston 10, Mass.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N. Y.
Weirton Steel Co., Weirton, W. Va.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

STEEL (Stainless)—See listings marked "*" under individual product headings.

STEEL (Strip)

Bissett Steel Co., The, 945 E. 67th St., Cleveland 8, O.
Caine Steel Co., 1820 N. Central Ave., Chicago 39, Ill.

STEEL (Strip—Brass, Bronze, Copper and Nickel Coated)

American Nickeloid Co., 1310 Second St., Peru, Ill.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Stanley Works, The, New Britain & Bridgeport, Conn.
Thomas Steel Co., The Warren, O.
Weirton Steel Co., Weirton, W. Va.

STEEL (Strip—Hot or Cold Rolled) (*Also Stainless)

Alan Wood Steel Co., Conshohocken, Pa.
*Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
*American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
American Tube & Stamping Plant, (Stanley Wks.) Bridgeport 7, Conn.
Benedict-Miller Inc., 216 Clifford St., Newark 5, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
Caine Steel Co., 1820 N. Central Ave., Chicago 39, Ill.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
*Cold Metal Products Co., The, 2131 Wilson Ave., Youngstown 1, O.
Columbia Steel Co., San Francisco 6, Calif.
Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 23, Mich.
Enterprise Galvanizing Co., Almond & E. Firth Sts., Philadelphia 25, Pa.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
*Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
*Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Sharon Steel Corp., Sharon, Pa.
*Stanley Works, The, New Britain & Bridgeport, Conn.
*Superior Steel Corp., Carnegie, Pa.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Thomas Steel Co., The, Warren, O.
*United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Ward Steel Co., 44 Farnsworth St., Boston 10, Mass.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N. Y.
Weirton Steel Co., Weirton, W. Va.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Worcester Pressed Steel Co., 512 Barber Ave., Worcester 6, Mass.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

STEEL (Strip—Lacquer Coated)

American Nickeloid Co., 1310 Second St., Peru, Ill.
Thomas Steel Co., The, Warren, O.

STEEL (Strip—Solder Coated)

Thomas Steel Co., The, Warren, O.

STEEL (Strip—Tin Coated)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Thomas Steel Co., The, Warren, O.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N. Y.

STEEL (Strip—Zinc Coated)

American Nickeloid Co., 1310 Second St., Peru, Ill.
American Rolling Mill Co., The, 2981 Curtis St., Middletown, O.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.

STEEL (Strip—Zinc Coated) (Con.)

Roebling's, John A., Sons Co., Trenton 2, N. J.
Thomas Steel Co., The, Warren, O.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N. Y.
Weirton Steel Co., Weirton, W. Va.

STEEL (Structural) (*Also Stainless)

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
American Petrometal Corp., Broadway at 11th St., Long Island City 2, N. Y.
Bedford Foundry & Mach. Co., Bedford, Ind.
Belmont Iron Works, 22nd St. and Washington Ave., Philadelphia 46, Pa.
Benedict-Miller Inc., 216 Clifford St., Newark 5, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
*Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
*Columbia Steel Co., San Francisco 6, Calif.
Duffin Iron Company, 37 W. Van Buren St., Chicago 5, Ill.
*Enterprise Galvanizing Co., Almond & E. Firth Sts., Philadelphia 25, Pa.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Ingalls Iron Works Co., The, Birmingham 2, Ala.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
*Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
*United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Weirton Steel Co., Weirton, W. Va.
Wisconsin Steel Co., 180 N. Michigan Ave., Chicago 1, Ill.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

STEEL BUILDINGS—See BRIDGES, BUILDINGS, ETC.

STEEL DOORS & SHUTTERS—See DOORS & SHUTTERS

STEEL FABRICATORS—See BRIDGES, BUILDINGS, ETC.

STEEL PLATE CONSTRUCTION

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Belmont Iron Works, 22nd St. and Washington Ave., Philadelphia 46, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Duffin Iron Company, 37 W. Van Buren St., Chicago 5, Ill.
Federal Shipbuilding & Dry Dock Co., Kearney, N. J.
General American Transportation Corp., 514C Graybar Bldg., New York 17, N. Y.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Ingalls Iron Works Co., The, Birmingham 2, Ala.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Struthers Wells Corp., Titusville, Pa.

STELLITE

Haynes Stellite Co., Harrison and Lindsay Sts., Kokomo, Ind.

STENCILS (Spray and Sand Blast)

Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

STEPS (Safety)

Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.

STOKERS

Babcock & Wilcox Co., The, 85 Liberty St., New York 6, N. Y.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Link-Belt Co., 2410 W. 18th St., Chicago 8, Ill.
Steel Products Engineering Co., The, 1205 W. Columbia St., Springfield, O.
Westinghouse Electric Corp., Steam Div., Lester, Pa.

STONES (Honing, Polishing, Sharpening)

Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., The, Niagara Falls, N. Y.
Norton Company, Worcester, 6, Mass.

STOPPERS (Cinder Notch)

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Brosius, Edgar E., Co., Sharpsburg P. O., Pittsburgh 15, Pa.

STOPPERS (Rubber)

Rhoades, R. W., Metaline Co., Inc., 50-17 Fifth St., Long Island City 1, N. Y.

STORAGE BATTERIES—See BATTERIES (Storage)

STRAIGHTENING MACHINES—See BENDING & STRAIGHTENING MACHINES

STRAINERS (Duplex Pipe Line "Y" Type, Pressure or Suction Line)

Zurn, J. A., Mfg. Co., Erie, Pa.

STUD DRIVERS

Titan Tool Co., Fairview, Pa.

STUD REMOVERS

Titan Tool Co., Fairview, Pa.

STUDS (Iron & Steel)

Bethlehem Steel Co., Bethlehem, Pa.
Central Screw Co., Chicago 9, Ill.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
Manufacturers Screw Products, 331 W. Hubbard St., Chicago 10, Ill.
Milton Mfg. Co., The, Milton, Pa.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Western Automatic Machine Screw Co., Elyria, O.

SUMP CLEANERS

Honan-Crane Corp., 210 S. Wabash Ave., Lebanon, Ind.

SWAGING MACHINES

Torrington Co., The, Torrington, Conn.

SWITCHES (Electric)

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Federal Electric Products Co., 50 Paris St., Newark 5, N. J.
General Electric Co., Schenectady 5, N. Y.
McGill Mfg. Co., Inc., Valparaiso, Ind.
Square D Co., 6060 Rivard St., Detroit 11, Mich.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Dept. 7-N, East Pittsburgh, Pa.

TACHOMETERS

Bristol Co., The, Waterbury 91, Conn.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Stewart-Warner Corp. Instrument Div. 1828 W. Diversey Pkwy., Chicago 14, Ill.
Sticht, Herman H., Co., 27 Park Place, New York 7, N. Y.
Veeder-Root, Inc., Hartford 2, Conn.
Westinghouse Electric Corp., Orange Ave., Newark 1, N. J.

TANKS (Gas Auxiliary)

Webb Corp., The, Webb City, Mo.

TANKS (Pickling)

Goodrich, B. F., Co., The, Akron 18, O.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
National Lead Co., 111 Broadway, New York 6, N. Y.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Youngstown Welding & Eng. Co., 3711 Oakwood Ave., Youngstown 9, O.

TANKS (Plating)

Goodrich, B. F., Co., The, Akron 18, O.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

TANKS (Storage, Pressure, Riveted, Welded)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Avondale Marine Ways, Inc., Westwego, La.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
General American Transportation Corp., 514C Graybar Bldg., New York 17, N. Y.
Ingalls Iron Works Co., The, Birmingham 2, Ala.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
National Annealing Box Co., Washington, Pa.
Rheem Research Products, 206 Standard Oil Bldg., Baltimore 2, Md.
Scaife Co., Ann St., Oakmont, Pa.
Struthers Wells Corp., Titusville, Pa.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Van Dorn Iron Works Co., 2685 E. 79th St., Cleveland 4, O.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

TANKS (Wood or Steel, Rubber or Lead Lined)

Goodrich, B. F., Co., The, Akron 18, O.
Heil Engineering Co., 12903 Elmwood Ave., Cleveland 11, O.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
National Lead Co., 111 Broadway, New York 6, N. Y.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.

TAPES (Adhesive-Paper, Cloth, Fibre, Acetate, Film Backing)

General Electric Co., Bridgeport 2, Conn.
Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.
Nox-Rust Corporation, 2463 S. Halsted St., Chicago 8, Ill.

TAPPING MACHINES

Cincinnati Bickford Tool Co., 3220 Forrer Ave., Cincinnati 9, O.
Haskins, R. G., Co., 615 S. California Ave., Chicago 12, Ill.
Moline Tool Co., 102 20th St., Moline, Ill.
National Automatic Tool Co., S. 7th & N Sts., Richmond, Ind.
Snyder Tool & Engineering Co., 3400 E. Lafayette St., Detroit 7, Mich.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

TAPS AND DIES

Consolidated Machine Tool Corp., 565 Blossom Rd., Rochester 10, N. Y.
Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Greenfield Tap & Die Corp., Greenfield, Mass.
Landis Machine Co., Waynesboro, Pa.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.
Sossner Co., 161 Grand St., New York 13, N. Y.
Woodworth, N. A., Co., 1300 E. Nine Mile Rd., Detroit 20, Mich.

TERNE PLATE—See TIN OR TERNE PLATE

TESTING EQUIPMENT (Hydrostatic)

Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Pines Engineering Co., 215 S. Highland, Aurora, Ill.

TESTING EQUIPMENT (Laboratory)

Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Hydraulic Machinery, Inc., 12825 Ford Rd., Dearborn, Mich.
Steel City Testing Laboratory, 8843 Livernois Ave., Detroit 4, Mich.

TESTING EQUIPMENT (Portable)

Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Steel City Testing Laboratory, 8843 Livernois Ave., Detroit 4, Mich.

TESTING MACHINERY (Materials)

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
National Broach & Machine Co., 5600 St. Jean Ave., Detroit 18, Mich.
Riehle Testing Machine Div., American Machine & Metals, Inc., E. Moline, Ill.
Steel City Testing Laboratory, 8843 Livernois Ave., Detroit 4, Mich.

THERMIT WELDING EQUIPMENT AND MATERIALS

Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.

THERMOMETERS

Bristol Co., The, Waterbury 91, Conn.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.

THREAD CUTTING TOOLS

Bokum Tool Co., 14775 Wildemere Ave., Detroit 21, Mich.
Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
Landis Machine Co., Waynesboro, Pa.
Oster Mfg. Co., The, 2037 E. 61st St., Cleveland 3, O.
Pines Engineering Co., 215 S. Highland, Aurora, Ill.
Sossner Co., 161 Grand St., New York 13, N. Y.

THREAD MILLING MACHINES

Master Mfg. Co., Hutchinson, Kans.

THREADING MACHINES

Landis Machine Co., Inc., Waynesboro, Pa.
Oster Mfg. Co., The, 2037 E. 61st Place, Cleveland 3, O.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.

TIE PLATES

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

TIN OR TERNE PLATE

American Rolling Mill Co., The, 2981 Curtis St., Middleton, O.
Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Granite City Steel Co., Granite City, Ill.

TIN OR TERNE PLATE (Con.)

Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

TIN PLATE MACHINERY

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore 2, Md.
Wean Engineering Co., Inc., The, Warren, O.

TITANIUM

Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Metal Hydrides, Inc., 12-24 Congress St., Beverly, Mass.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

TONGS (Automatic)

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Heppenstall Co., Dept. TP, 4620 Hatfield St., Pittsburgh 1, Pa.

TONGS (Chain Pipe)

Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

TONGS (Rail Handling)

Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.

TOOL BITS

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Anchor Drawn Steel Co., Latrobe, Pa.
Benedict-Miller, Inc., 216 Clifford St., Newark 5, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
Bissett Steel Co., The, 945 E. 67th St., Cleveland 8, O.
Bokum Tool Co., 14775 Wildemere Ave., Detroit 21, Mich.
Colonial Steel Div., Vanadium-Alloys Steel Co., Grant Bldg., Pittsburgh 19, Pa.
Crane-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Jessop Steel Co., 584 Green St., Washington, Pa.
Masterform Tool Co., 2532 Irving Park Blvd., Chicago 18, Ill.
Vanadium-Alloys Steel Co., Latrobe, Pa.

TOOL BITS (High Speed)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Benedict-Miller, Inc., 216 Clifford St., Newark 5, N. J.
Bethlehem Steel Co., Bethlehem, Pa.
Bissett Steel Co., The, 945 E. 67th St., Cleveland 8, O.
Bokum Tool Co., 14775 Wildemere Ave., Detroit 21, Mich.
Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Crane-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Disston, Henry, & Sons, Inc., 1126 Tacony, Philadelphia 35, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Haynes Stellite Co., Harrison and Lindsay Sts., Kokomo, Ind.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Jessop Steel Co., 584 Green St., Washington, Pa.
Latrobe Electric Steel Co., Latrobe, Pa.
Masterform Tool Co., 2532 Irving Park Blvd., Chicago 18, Ill.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Simonds Saw & Steel Co., 1850 Columbia Rd., Boston 27, Mass.
Ziv Steel & Wire Co., 2945 W. Harrison St., Chicago 12, Ill.

TOOL DESIGNING & BUILDING

Atlas Tool & Designing Co., Castor & Kensington Aves., Philadelphia 24, Pa.
Merz Engineering Co., Indianapolis 7, Ind.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.

TOOL HARDENING

Commercial Metals Treating, Inc., 177 S. St. Clair St., Toledo 1, O.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.

TOOL HOLDERS

Bellows Co., The, 869 Tallmadge Ave., Akron 10, O.
Bokum Tool Co., 14775 Wildemere Ave., Detroit 21, Mich.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

TOOLS (Carbide Tipped)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Bokum Tool Co., 14775 Wildemere Ave., Detroit 21, Mich.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Spe-D-Cut Tool Co., Hannibal, Mo.
Vascoloy-Ramet Corp., N. Chicago, Ill.
Ziv Steel & Wire Co., 2945 W. Harrison St., Chicago 12, Ill.

TOOLS (Electric)

Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.

TOOLS (Hand)

New Britain Machine Co., New Britain, Conn.
Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.
Young & Ward Inc., Fair & Elm Sts., Hillsboro, O.

TOOLS (Non-Sparking, Safety)

Ampco Metal, Inc., Dept. S12, Milwaukee 4, Wis.

TOOLS (Pneumatic)

Bellows Co., The, 869 Tallmadge Ave., Akron 10, O.
Cleveland Pneumatic Tool Co., The, 3781 E. 77th St., Cleveland 5, O.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave., Cleveland 14, O.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.
Young & Ward Inc., Fair & Elm Sts., Hillsboro, O.

TOOLS (Precision, Metal Cutting, etc.)

Barber-Colman Co., 150 Loomis St., Rockford, Ill.
Bokum Tool Co., 14775 Wildemere Ave., Detroit 21, Mich.
Brown & Sharpe Mfg. Co., Providence 1, R. I.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 6, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Gisholt Machine Co., 1217 E. Washington Ave., Madison 3, Wis.
Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39, Ill.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Master Mfg. Co., Hutchinson, Kans.
Masterform Tool Co., 2532 Irving Park Blvd., Chicago 18, Ill.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.
Micromatic Hone Corp., 1800 Schoolcraft Ave., Detroit 4, Mich.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.
Spe-D-Cut Tool Co., Hannibal, Mo.
Vascoloy-Ramet Corp., N. Chicago, Ill.
Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, O.
Woodworth, N. A., Co., 1300 E. Nine Mile Rd., Detroit 20, Mich.

TORCHES & BURNERS (Acetylene, Blow, Oxy-Acetylene)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Black Mfg. Co., 1416-1428 W. Baltimore St., Baltimore 23, Md.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

TORQUE CONVERTERS (Hydraulic)

Twin Disc Clutch Co., 1379 Racine Ave., Racine, Wis.

TOWBOATS

Avondale Marine Ways, Inc., Westwego, La.
Ingalls Iron Works Co., The, Birmingham 2, Ala.

TOWERS (Transmission)

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.

TRACK ACCESSORIES

Bethlehem Steel Co., Bethlehem, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Foster, L. B. Co., Inc., P. O. Box 1647, Pittsburgh, Pa.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

TRACK BOLTS—See BOLTS (Track)

TRAILERS

Easton Car & Construction Co., Easton, Pa.
Mercury Manufacturing Company, The, 4140 S. Halsted St., Chicago 9, Ill.
Ohio Galvanizing & Mfg. Co., Penn St., Niles, O.

TRAMRAILS

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1125 E. 283rd St., Wickliffe, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.

TRANSFORMERS (Electric)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
General Electric Co., Schenectady 5, N. Y.
Westinghouse Electric Corp., Sharon, Pa.

TRANSFORMERS (Resistance Welding)

General Electric Co., Schenectady 5, N. Y.
Progressive Welder Co., 3050 E. Outer Dr., Detroit 12, Mich.
Taylor-Winfield Corp., Warren, O.

TRANSMISSIONS (Automotive)

Clark Equipment Co., Buchanan, Mich.
Cleveland Worm & Gear Co., The, 3270 E. 80th St., Cleveland 4, O.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
James, D. O. Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.

TRANSMISSIONS—VARIABLE SPEED

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Link-Belt Co., 2045 W. Hunting Park Ave., Philadelphia 40, Pa.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

TREADS (Safety)

Alan Wood Steel Co., Conshohocken, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Carnegie-Illinois Steel Corp., Pittsburgh-Chicago.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.
Norton Company, Worcester 6, Mass.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Tri-Lok Co., 5515 Butler St., Pittsburgh 1, Pa.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.

TROLLEYS

American MonoRail Co., The, 13102 Athens Ave., Cleveland 7, O.
Chisholm-Moore Hoist Corp., 118 Fremont Ave., Tonawanda, N. Y.
Ford Chain Block Div., American Chain & Cable Co., Inc., 2nd & Diamond Sts., Philadelphia 22, Pa.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
Wright Mfg. Div. of American Chain & Cable Co., Inc., York, Pa.

TRUCK CRANES

Dempster Brothers, Inc., 294 Shea Rd., Knoxville 17, Tenn.
Northwest Engineering Co., 28 E. Jackson Blvd., Chicago 4, Ill.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.
Thew Shovel Co., The, Lorain, O.

TRUCKS (Barrel)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Revolvator Co., 391 86th St., N. Bergen, N. J.
Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y.

TRUCKS (Boom)

Dempster Brothers, Inc., 294 Shea Rd., Knoxville 17, Tenn.

TRUCKS (Dump-Industrial)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Clark Tructractor Div. Clark Equipment Co., Battle Creek, Mich.
Crescent Truck Co., 1100 Willow St., Lebanon, Pa.
Dempster Brothers, Inc., 294 Shea Rd., Knoxville 17, Tenn.
Easton Car & Construction Co., Easton, Pa.
Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland 14, O.
Towmotor Corp., 1223 E. 152nd St., Cleveland 10, O.

TRUCKS (Hand Lift)

Revolvator Co., 391 86th St., N. Bergen, N. J.
Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y.

TRUCKS (Hydraulic Lift)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Baker-Raulang Co., The, 2167 W. 25th St., Cleveland 13, O.
Clark Tructractor Div. Clark Equipment Co., Battle Creek, Mich.
Dempster Brothers, Inc., 294 Shea Rd., Knoxville 17, Tenn.
Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland 14, O.

TRUCKS (Hydraulic Lift) (Con.)

Mercury Manufacturing Company, The, 4140 S. Halsted St., Chicago 9, Ill.
Towmotor Corp., 1223 E. 152nd St., Cleveland 10, O.

TRUCKS (Industrial)

Baker-Raulang Co., The, 2167 W. 25th St., Cleveland 13, O.
Clark Tructractor Div. Clark Equipment Co., Battle Creek, Mich.
Crescent Truck Co., 1100 Willow St., Lebanon, Pa.
Dempster Brothers, Inc., 294 Shea Rd., Knoxville 17, Tenn.
Easton Car & Construction Co., Easton, Pa.
Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland 14, O.
Mercury Manufacturing Company, The, 4140 S. Halsted St., Chicago 9, Ill.
Ohio Galvanizing & Mfg. Co., Penn St., Niles, O.
Rapids Standard Co., Inc., The, Peoples Natl. Bank Bldg., Grand Rapids 2, Mich.
Revolvator Company, 391 86th St., N. Bergen, N. J.
Ross Carrier Corp., Benton Harbor, Mich.
Towmotor Corp., 1223 E. 152nd St., Cleveland 10, O.
Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y.

TRUCKS (Lift)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Baker-Raulang Co., The, 2167 W. 25th St., Cleveland 13, O.
Clark Trucktractor Div., Clark Equipment Co., Battle Creek, Mich.
Crescent Truck Co., 1100 Willow St., Lebanon, Pa.
Easton Car & Construction Co., Easton, Pa.
Elwell-Parker Electric Co., 4501 St. Clair Ave., Cleveland 14, O.
Jaeger Machine Co., The, 550 W. Spring St., Columbus 15, O.
Mercury Manufacturing Company, The, 4140 S. Halsted St., Chicago 9, Ill.
Revolvator Company, 391 86th St., N. Bergen, N. J.
Ross Carrier Corp., Benton Harbor, Mich.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.
Towmotor Corp., 1223 E. 152nd St., Cleveland 10, O.
Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y.

TRUCKS (Oil Handling)

Honan-Crane Corp., 210 S. Wabash Ave., Lebanon, Ind.

TRUCKS (Straddle)

Ross Carrier Corp., Benton Harbor, Mich.

TRUCKS AND TRACTORS (Electric Industrial)

Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Baker-Raulang Co., The, 2167 W. 25th St., Cleveland 13, O.
Crescent Truck Co., 1100 Willow St., Lebanon, Pa.
Easton Car & Construction Co., Easton, Pa.
Elwell-Parker Electric Co., 4501 St. Clair Ave., Cleveland 14, O.
Mercury Manufacturing Company, The, 4140 S. Halsted St., Chicago 9, Ill.
Wright-Hibbard Industrial Electric Truck Co., Inc., Phelps, N. Y.

TRUCKS AND TRACTORS (Gasoline or Diesel—Industrial)

Baker-Raulang Co., The, 2167 W. 25th St., Cleveland 13, O.
Crescent Truck Co., 1100 Willow St., Lebanon, Pa.
Elwell-Parker Electric Co., The, 4501 St. Clair Ave., Cleveland 14, O.
Mercury Manufacturing Company, The, 4140 S. Halsted St., Chicago 9, Ill.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.
Towmotor Corp., 1223 E. 152nd St., Cleveland 10, O.

TUBE FITTINGS

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Stewart-Warner Corp., Alemite Div., 1828 W. Diversey Pkwy., Chicago 14, Ill.
Trabon Engineering Corp., 1818 E. 40th St., Cleveland 3, O.
Weatherhead Co., The, 300 East 131st St., Cleveland 8, O.

TUBE MILL EQUIPMENT

Aetna-Standard Engineering Co., The, Home Savings Bank Bldg., Youngstown 1, O.
Bigwood, Joshua, & Son Ltd., Wolverhampton, England
Mackintosh-Hemphill Co., 9th and Bingham Sts., Pittsburgh 3, Pa.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
Wean Engineering Co., Inc., The, Warren, O.
Yoder Co., The, 5500 Walworth Ave, Cleveland 2, O.

TUBE WELDING MACHINES

Bigwood, Joshua, & Son Ltd., Wolverhampton, England
Yoder Co., The, 5500 Walworth Ave., Cleveland 2, O.

TUBES (Alloy Steel) (*Also Stainless)

*Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
*Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
*National Annealing Box Co., Washington, Pa.
*National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
*Steel and Tubes Div. Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.

TUBES (Bimetal)

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
Tube Reducing Corp., Wallington, N. J.

TUBES (Boiler)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bissett Steel Co., The, 945 E. 67th St., Cleveland 8, O.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Ohio Seamless Tube Co., The, Shelby, O.
Pittsburgh Steel Co., The, 1643 Grant Bldg., Pittsburgh 30, Pa.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
Standard Tube Co., The, 14600 Woodward Ave., Detroit 3, Mich.
Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

TUBES (Brass, Bronze, Copper, Nickel, Nickel Silver)

Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Penn Brass & Copper Co., Erie, Pa.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Shenango-Penn Mold Co., 457 W. Third St., Dover, O.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

TUBES (Combustion)

Carborundum Co., The, Niagara Falls, N. Y.
Norton Co., Worcester 6, Mass.

TUBES (High Carbon)

Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Ohio Seamless Tube Co., The, Shelby, O.
Standard Tube Co., The, 14600 Woodward Ave., Detroit 3, Mich.
Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tube Reducing Corp., Wallington, N. J.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.

TUBES (Seamless Steel)

Tube Reducing Corp., Wallington, N. J.

TUBING (Alloy Steel) (*Also Stainless)

*Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
*Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
American Cast Iron Pipe Co., 2030 N. 16th St., Birmingham 2, Ala.
*Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bissett Steel Co., The, 945 E. 67th St., Cleveland 8, O.
*Columbia Steel Co., San Francisco 6, Calif.
*Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
*Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Michigan Steel Tube Products Co., 9450 Buffalo St., Detroit 12, Mich.
*National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Ohio Seamless Tube Co., The, Shelby, O.
*Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
SKF Steels, Inc., 420 Lexington Ave., New York 17, N. Y.
*Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tube Reducing Corp., Wallington, N. J.
*Tubular Service Corp., 32 Broadway, New York 4, N. Y.
*United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.
*Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

TUBING (Aluminum or Magnesium)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Dow Chemical Co., The, Midland, Mich.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

TUBING (Brass, Silicon-Bronze, Copper or Monel)

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
Bundy Tubing Co., 10951 Hern Ave., Detroit 13, Mich.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
Revere Copper & Brass Inc., 230 Park Ave., New York 17, N. Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Shenango-Penn Mold Co., 457 W. Third St., Dover, O.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

TUBING (Condenser)

Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.

TUBING (Flexible Metal)

American Brass Co., The, Waterbury 88, Conn.
American Metal Hose Branch of The American Brass Co., Waterbury 88, Conn.
Chicago Metal Hose Corp., 1315 S. Third St., Maywood, Ill.
Pennsylvania Flexible Metallic Tubing Co., 7250 Powers Lane, Philadelphia 42, Pa.

TUBING (Mechanical)

Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
Michigan Steel Tube Products Co., 9450 Buffalo St., Detroit 12, Mich.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tube Reducing Corp., Wallington, N. J.

TUBING (Rubber)

Boston Woven Hose & Rubber Co., P.O. Box 1071, Boston 3, Mass.
Goodrich, B. F., Co., The, Akron 18, O.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

TUBING (Seamless)

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
SKF Steels, Inc., 420 Lexington Ave., New York 17, N. Y.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.

TUBING (Seamless, Aluminum)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

TUBING (Seamless Flexible Metal)

American Metal Hose Branch of The American Brass Co., Waterbury 88, Conn.

TUBING (Seamless Steel)

Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bissett Steel Co., The, 945 E. 67th St., Cleveland 8, O.
Columbia Steel Co., San Francisco 6, Calif.
Frasse, Peter A., and Co., Inc., 17 Grand St., New York 13, N. Y.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Ohio Seamless Tube Co., The, Shelby, O.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.
SKF Steels, Inc., 420 Lexington Ave., New York 17, N. Y.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.
Ward Steel Co., 44 Farnsworth St., Boston 10, Mass.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

TUBING (Square, Rectangular and Shapes) (*Also Stainless)

*Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
*Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
*Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
*Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
*Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Michigan Steel Tube Products Co., 9450 Buffalo St., Detroit 12, Mich.
*National Tube Co., Frick Bldg., Pittsburgh 30, Pa.

TUBING (Square, Rectangular and Shapes) (*Also Stainless) (Con.)

Ohio Seamless Tube Co., The, Shelby, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Standard Tube Co., The, 14600 Woodward Ave., Detroit 3, Mich.
*Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.

TUBING (Tool Steel)

Bissett Steel Co., The, 945 E. 67th St., Cleveland 8, O.
Sandvik Steel, Inc., 111 Eighth Ave., New York 11, N. Y.

TUBING (Welded)

Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Steel and Tubes Div. Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.

TUBING (Welded Steel) (*Also Stainless)

*Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
*Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Babcock & Wilcox Tube Co., The, Welded Tube Div., Alliance, O.
Bundy Tubing Co., 10951 Hern Ave., Detroit 13, Mich.
*Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Frasse, Peter A., and Co., Inc., 17 Grand St., New York 13, N. Y.
*Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Michigan Steel Tube Products Co., 9450 Buffalo St., Detroit 12, Mich.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Ohio Seamless Tube Co., The, Shelby, O.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Revere Copper & Brass Inc., 230 Park Ave., New York 17, N. Y.
Standard Tube Co., The, 14600 Woodward Ave., Detroit 3, Mich.
*Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.
Ward Steel Co., 44 Farnsworth St., Boston 10, Mass.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.
*Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

TUBULAR PRODUCTS

Agaloy Tubing Co., 1027 Newark Ave., Elizabeth 3, N. J.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Bundy Tubing Co., 10951 Hern Ave. Detroit 13, Mich.
Michigan Steel Tube Products Co., 9450 Buffalo St., Detroit 12, Mich
National Tube Co., Frick Bldg., Pittsburgh 30, Pa
Ohio Seamless Tube Co., The, Shelby, O.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Standard Tube Co., The, 14600 Woodward Ave., Detroit 3, Mich
Steel and Tubes Division, Republic Steel Corp., 226 E. 131st St., Cleveland 8, O.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tubular Service Corp., 32 Broadway, New York 4, N. Y.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

TUMBLING BARRELS (Coke Testing)

Brosius, Edgar E., Co., Sharpsburg P. O., Pittsburgh 15, Pa.

TUNGSTEN CARBIDE

Haynes Stellite Co., Harrison and Lindsay Sts., Kokomo, Ind.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich.

TUNGSTEN CARBIDE (Tools and Dies)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
Carboloy Co., Inc., 11141 E. 8 Mile Ave., Detroit 32, Mich.
Firth-Sterling Steel Co., McKeesport, Pa.
Jessop Steel Co., 584 Green St., Washington, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.

TUNGSTEN METAL AND ALLOYS

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.

TURBINES (Steam)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
DeLaval Steam Turbine Co., Trenton 8, N. J.
General Electric Co., Schenectady 5, N. Y.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

TURBO BLOWERS—See BLOWERS

TURNTABLES

American Bridge Co., Frick Bldg., Pittsburgh 19, Pa.
Atlas Car & Mfg. Co., The, 1100 Ivanhoe Rd., Cleveland 10, O.
Bethlehem Steel Co., Bethlehem, Pa.
Easton Car & Construction Co., Easton, Pa.

TURRET LATHES—See LATHES (Turret)

TURRET LATHE CUTTERS (Carbide Tipped)

Firth-Sterling Steel Co., McKeesport, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.

TWIST DRILLS

Clark Equipment Co., Buchanan, Mich.
Cleveland Twist Drill Co., The, 1242 E. 49th St., Cleveland 14, O.
Greenfield Tap & Die Corp., Greenfield, Mass.

TYPE (Steel)

Cunningham, M. E., Co., 172 E. Carson St., Pittsburgh 19, Pa.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.

VACUUM CLEANERS

General Electric Co., Bridgeport 2, Conn.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.

VACUUM TUBES (Industrial Power)

Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
General Electric Co., Schenectady 5, N. Y.

VALVE CONTROLS

Bristol Co., The, Waterbury 91, Conn.
Hays Corp., The, 960 Eighth Ave., Michigan City, Ind.
Philadelphia Gear Works, Erie Ave. & G St., Philadelphia 34, Pa.

VALVE CONTROLS (Motor-Operated Units)

Bristol Co., The, Waterbury 91, Conn.
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Ward Leonard Electric Co., 65 South St., Mt. Vernon, N. Y.

VALVES (Air Blast)

Littell, F. J., Machine Co., 4165 N. Ravenswood Ave., Chicago 13, Ill.

VALVES (Blast Furnace)

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Brosius, Edgar E., Co., Sharpsburg P. O., Pittsburgh 15, Pa.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
R-S Products Corp., 122 Berkley St., Philadelphia 44, Pa.

VALVES (Blow-off)

Homestead Valve Mfg. Co., P. O. Box 22, Coraopolis, Pa
Nordstrom Valve Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.
United States Steel Supply Co., P. O. Box MM, Chicago 90, Ill.

VALVES (Butterfly)

R-S Products Corp., 122 Berkley St., Philadelphia 44, Pa.

VALVES (Check)

Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Reading-Pratt & Cady Div. of American Chain & Cable Co., Inc., Reading, Pa.
Weatherhead Co., The, 300 E. 131st St., Cleveland 8, O.
Zurn, J. A., Mfg. Co., Erie, Pa.

VALVES (Chemical)

Goodrich, B. F., Co., The, Akron 18, O.
Nordstrom Valve Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

VALVES (Compressed Gas Cylinder)

Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.

VALVES (Control—Air or Hydraulic)

Anker-Holth Mfg. Co., 2723 Connors St., Port Huron, Mich.
Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa
Bellows Co., The, 869 Tallmadge Ave., Akron 10, O.
Bristol Co., The, Waterbury 91, Conn.
Cleveland Pneumatic Tool Co., The, 3781 E. 77th St., Cleveland 5, O.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Galland-Henning Mfg. Co., 2747 S. 31st St., Milwaukee 7, Wis.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Homestead Valve Mfg. Co., P. O. Box 22, Coraopolis, Pa.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Nordstrom Valve Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
R-S Products Corp., 122 Berkley St., Philadelphia 44, Pa.
Vickers, Inc., 1480 Oakman Blvd., Detroit 32, Mich.
Weatherhead Co., The, 300 E. 131st St., Cleveland 8, O.

VALVES (Electrically Operated)

Bristol Co., The, Waterbury 91, Conn.
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Galland-Henning Mfg. Co., 2747 S. 31st St., Milwaukee 7, Wis.
Nordstrom Valve Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.
R-S Products Corp., 122 Berkley St., Philadelphia 44, Pa.

VALVES (Foot)

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Galland-Henning Mfg. Co., 2747 S. 31st St., Milwaukee 7, Wis.
Wood, R. D., Co., 400 Chestnut St., Philadelphia 5, Pa.

VALVES (Gas and Air Reversing)

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.

VALVES (Gate)

Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Reading-Pratt & Cady Div. of American Chain & Cable Co., Inc., Reading, Pa.

VALVES (Globe)

National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
Reading-Pratt & Cady Div. of American Chain & Cable Co., Inc., Reading, Pa.

VALVES (Goggle)

Bailey, Wm. M., Co., 702 Magee Bldg., Pittsburgh 22, Pa.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.

VALVES (Hydraulic)

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall P. O., Philadelphia 42, Pa.
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Galland-Henning Mfg. Co., 2747 S. 31st St., Milwaukee 7, Wis.
Homestead Valve Mfg. Co., P. O. Box 22, Coraopolis, Pa.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
New York Air Brake Co., The, 420 Lexington Ave., New York 17, N. Y.
Nordstrom Valve Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
R-S Products Corp., 122 Berkley St., Philadelphia 44, Pa.
Vickers, Inc., 1480 Oakman Blvd., Detroit 32, Mich.
Wood, R. D., Co., 400 Chestnut St., Philadelphia 5, Pa.

VALVES (Lubricated Plug)

Nordstrom Valve Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.

VALVES (Needle)

Baldwin Southwark Div., Baldwin Locomotive Works, The, Paschall, P.O., Philadelphia 42, Pa.
Reading-Pratt & Cady Div. of American Chain & Cable Co., Inc., Reading, Pa.

VALVES (Plug)

Homestead Valve Mfg. Co., P. O. Box 22, Coraopolis, Pa.

VALVES (Steam, Water)

R-S Products Corp., 122 Berkley St., Philadelphia 44, Pa.
Reading-Pratt & Cady Div. of American Chain & Cable Co., Inc., Reading, Pa.

VANADIUM

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Vanadium Corp. of America, 420 Lexington Ave., New York 17, N. Y.

VENTILATING EQUIPMENT

Buffalo Forge Co., 158 Mortimer St., Buffalo 5, N. Y.
Burt Mfg. Company, The, 400 S. High St., Akron 11, O.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.
Sturtevant, B. F. Co., Hyde Park, Boston 36, Mass.

VENTILATING EQUIPMENT (Engine)

Donaldson Co., 866 Pelham St., St. Paul 4, Minn.

VENTILATORS (Roof)

Burt Mfg. Company, The, 400 High St., Akron 11, O.

VENTS (Safety)

Zurn, J. A., Mfg. Co., Erie, Pa.

VIADUCTS (Steel)—See BRIDGES, ETC.

VIBRATION DAMPENERS

Goodrich, B. F. Co., The, Akron 18, O.
Harris Products Co., 634 Huron Rd., Cleveland 15, O.
Korfund Co., Inc., The, 48-37 32nd Place, Long Island City 1, N. Y.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave., New York 20, N. Y.

VIBRATION ELIMINATORS, PIPING

Power Piping Div., Blaw-Knox Co., Beaver & Western Aves., Pittsburgh 2, Pa.

VIBRATION ISOLATORS (Steel Springs)

Korfund Co., Inc., The, 48-37 32nd Place, Long Island City 1, N. Y.

VISES (Hydraulic)

Air Hydraulics Div., Beyer Machine Co., Jackson, Mich.

VISES (Pneumatic)

Air Hydraulics Div., Beyer Machine Co., Jackson, Mich.
Bellows Co., The, 869 Tallmadge Ave., Akron 10, O.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.

WALKWAYS—See FLOORING—(Steel)

WASHERS (Iron and Steel)

Beall Tool Co., East Alton, Ill.
Bethlehem Steel Co., Bethlehem, Pa.
Garret, George K., Co., Inc., 1421 Chestnut St., Philadelphia 2, Pa
Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12. Mich
Master Products Co., The, 6400 Park Ave., Cleveland 5, O.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
U. S. Automatic Corp., Amherst, O.
Whitehead Stamping Co., 1667 W. Lafayette Blvd., Detroit 16, Mich.
Wrought Washer Mfg. Co., 2103 S. Bay St., Milwaukee 7, Wis.

WASHERS (Lead)

Master Products Co., The, 6400 Park Ave., Cleveland 5, O.
National Lead Co., 111 Broadway, New York 6, N. Y.
Wrought Washer Mfg. Co., 2103 S. Bay St., Milwaukee 7, Wis.

WASHERS (Lock)

Beall Tool Co., East Alton, Ill.
Garret, George K., Co., Inc., 1421 Chestnut St., Philadelphia 2, Pa.
Manufacturers Screw Products, 216 W. Hubbard St., Chicago 10, Ill.
Wrought Washer Mfg. Co., 2103 S Bay St., Milwaukee 7, Wis.

WASHERS (Nonferrous and Stainless)

Beall Tool Co., East Alton, Ill.
Garret, George K., Co., Inc., 1421 Chestnut St., Philadelphia 2, Pa.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
Master Products Co., The, 6400 Park Ave., Cleveland 5, O.
Shenango-Penn Mold Co., 457 W. Third St., Dover, O.
U. S. Automatic Corp., Amherst, O
Wrought Washer Mfg. Co., 2103 S Bay St., Milwaukee 7, Wis.

WASHERS (Spring)

Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Beall Tool Co., East Alton, Ill.
Garret, George K., Co., Inc., 1421 Chestnut St., Philadelphia 2, Pa
Master Products Co., The, 6400 Park Ave., Cleveland 5, O.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Wrought Washer Mfg. Co., 2103 S Bay St., Milwaukee 7, Wis.

WATER COOLERS

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
General Electric Co., (Air Conditioning & Commercial Refrigeration Div. Sec. 4412), Bloomfield, N. J.
Niagara Blower Co., Dept. S-105, 6 E. 45th St., New York 17, N. Y.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Westinghouse Electric Corp., 653 Page Blvd., Springfield 2, Mass

WATER FILTRATION & SOFTENING EQUIPMENT

Adams, R. P., Co., Inc., 75 Chicago St., Buffalo 4, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Carborundum Co., The, Niagara Falls, N. Y.

WELDED SHEET METAL ASSEMBLIES

Aircraft Mechanics, Inc., Nevada St., Colorado Springs, Colo.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Van Dorn Iron Works Co., 2685 E. 79th St., Cleveland 4, O.
Warren City Mfg. Co., Warren, O.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

WELDED STEEL CONSTRUCTION

Aircraft Mechanics, Inc., Nevada St., Colorado Springs, Colo.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Bethlehem Steel Co., Bethlehem, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.
Duffin Iron Company, 37 W. Van Buren St., Chicago 5, Ill.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Van Dorn Iron Works Co., 2685 E. 79th St., Cleveland 4, O.
Warren City Mfg. Co., Warren, O.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

WELDERS (Electric—Arc)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
General Electric Co., Schenectady 5, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Hobart Bros. Co., The, Box ST 16, Troy, O.
Lee, K. O., Co, Aberdeen, S. Dak
Lincoln Electric Co., The, Cleveland 1, O.
Mid-States Equipment Co., Welding Div., 2425 S. Michigan Ave., Chicago 16. Ill
Penn Tool & Machine Co., Danville, Ill.
Progressive Welder Co., 3050 E. Outer Drive. Detroit 12, Mich
Weldex, Inc., 7324 McDonald Ave., Detroit 10, Mich.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

WELDERS (Electric Resistance)

Federal Machine & Welder Co., 202 Dana St., Warren, O.
Weldex, Inc., 7324 McDonald Ave., Detroit 10, Mich.

WELDERS (Spot)

Federal Machine & Welder Co., 202 Dana St., Warren, O.
Progressive Welder Co., 3050 E. Outer Dr., Detroit 12, Mich.
Sciaky Bros., 4915 W. 67th St., Chicago 38, Ill.
Taylor-Winfield Corp., Warren, O.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.
Weldex, Inc., 7324 McDonald Ave., Detroit 10, Mich.

WELDING

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Avondale Marine Ways, Inc., Westwego, La.
Bartlett-Hayward Div., Koppers Co., Baltimore 3, Md.
Black Mfg. Co., 1416-1428 W. Baltimore St., Baltimore 23, Md.
Cleveland Welding Co., The, W. 117th St. & Berea Rd., Cleveland 7, O.
Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Lincoln Electric Co., The, Cleveland 1, O.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.
Penn Tool & Machine Co., Danville, Ill.
Scaife Co., Ann St., Oakmont, Pa.
Van Dorn Iron Works Co., 2685 E. 79th St., Cleveland 4, O.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.
Warren City Mfg. Co., Warren, O.

WELDING (Hard Surface)

Farrel-Birmingham Co., Inc., Ansonia, Conn.
Lincoln Electric Co., The, Cleveland 1, O.

WELDING (Resistance)

Cleveland Welding Co., The, W. 117th St. & Berea Rd., Cleveland 7, O.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.
Progressive Welder Co., 3050 E. Outer Drive, Detroit 12. Mich
Sciaky Bros., 4915 W. 67th St., Chicago 38, Ill.
Taylor-Winfield Corp., Warren, O
Warren City Mfg. Co., Warren, O.

WELDING (Stainless)

Aircraft Mechanics, Inc., Nevada St., Colorado Springs, Colo.
Arcos Corp., 1515 Locust St., Philadelphia 2, Pa.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14. Wis.
Industrial Steels, Inc., 246-250 Burt St., Cambridge 41, Mass.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Penn Tool & Machine Co., Danville, Ill.
Youngstown Welding & Eng. Co., The, 3711 Oakwood Ave., Youngstown 9, O.

WELDING (Thermit)

Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.

WELDING AND CUTTING APPARATUS AND SUPPLIES (Electric)

Air Reduction, 60. E. 42nd St., New York 17, N. Y.
Anaconda Wire & Cable Co., 25 Broadway, New York 4. N. Y
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
General Electric Co., Schenectady 5, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Hobart Bros. Co., The, Box ST 16, Troy, O.
Lincoln Electric Co., The, Cleveland 1, O.
Mid-States Equipment Co., Welding Div., 2425 S. Michigan Ave., Chicago 16, Ill.
Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.
Tweco Products Co., 1018 E. English St., Wichita 7, Kan.
United States Graphite Co., The, Holland Ave., Saginaw, Mich.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

WELDING AND CUTTING APPARATUS AND SUPPLIES (Oxy-Acetylene)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Black Mfg. Co., 1416-1428 W. Baltimore St., Baltimore 23, Md.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Mid-States Equipment Co., Welding Div., 2425 S. Michigan Ave., Chicago 16, Ill.
Modern Engineering Co., Inc., 3400 Pine St., St. Louis 3, Mo.
Oakite Products, Inc., 34E Thames St., New York 6, N. Y.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 54, Cal.
Victor Equipment Co., 844-54 Folsom St., San Francisco 7, Cal.

WELDING FIXTURES

Penn Tool & Machine Co., Danville, Ill.
Progressive Welder Co., 3050 E. Outer Drive, Detroit 12. Mich
Taylor-Winfield Corp., Warren, O.

WELDING POSITIONERS

Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.

WELDING RODS (Alloy) (*Also Stainless)

*Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
*Alloy Rods Co., York, Pa.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Agile Corp., 5800 Hough Ave., Cleveland 3, O.
*American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Arcos Corp., 1515 Locust St., Philadelphia 2, Pa.
*Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
Champion Rivet Co., The, 11200 Harvard Ave., Cleveland 5, O.
*Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
*Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14. Wis.
*Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y
*Lincoln Electric Co., Cleveland 1, O.
*Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Mid-States Equipment Co., Welding Div., 2425 S. Michigan Ave., Chicago 16, Ill.
Modern Engineering Co., Inc., 3400 Pine St., St. Louis 3, Mo.
*Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Reid-Avery Co., The, Cleveland & Chesapeake Sts., Baltimore 22, Md.
United States Steel Supply Co., P. O. Box M M. Chicago 90, Ill.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

WELDING RODS (Bronze)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
American Agile Corp., 5800 Hough Ave., Cleveland 3, O.
American Brass Co., The, Waterbury 88, Conn.
Ampco Metal Inc., Dept. S12, Milwaukee 4. Wis.
Arcos Corp., 1515 Locust St., Philadelphia 2, Pa.
Bridgeport Brass Co., Bridgeport 2, Conn.
Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y.
Lincoln Electric Co., The, Cleveland 1, O.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Mid-States Equipment Co., Welding Div., 2425 S. Michigan Ave., Chicago 16, Ill.
Modern Engineering Co., Inc., 3400 Pine St., St. Louis 3, Mo.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17. N. Y
Riverside Metal Co., Riverside, N. J.

WELDING RODS (Cast Iron)

American Agile Corp., 5800 Hough Ave., Cleveland 3, O.
Champion Rivet Co., The, 11200 Harvard Ave., Cleveland 5, O.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Lincoln Electric Co., The, Cleveland 1, O.
Modern Engineering Co., Inc., 3400 Pine St., St. Louis 3, Mo.

WELDING RODS (Hard Facing or Hard Surfacing)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
American Agile Corp., 5800 Hough Ave., Cleveland 3. O.
Arcos Corp., 1515 Locust St., Philadelphia 2, Pa.
Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14. Wis
Haynes Stellite Co., 30 E. 42nd St., New York 17, N. Y.
Lincoln Electric Co., The, Cleveland 1, O.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Mid-States Equipment Co., Welding Div., 2425 S. Michigan Ave., Chicago 16. Ill.
Modern Engineering Co., Inc., 3400 Pine St., St. Louis 3, Mo.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

WELDING RODS (Magnesium)

American Magnesium Corp., 1721 Gulf Bldg., Pittsburgh 19, Pa.
Dow Chemical Co., The, Midland, Mich.
Modern Engineering Co., Inc., 3400 Pine St., St. Louis 3, Mo.

WELDING RODS (Tool Steel)

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
American Agile Corp., 5800 Hough Ave., Cleveland 3, O.
Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Hobart Bros. Co., The, Box ST 16, Troy, O.
Lincoln Electric Co., The, Cleveland 1, O.
Modern Engineering Co., Inc., 3400 Pine St., St. Louis 3, Mo.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.

WELDING RODS OR WIRE

Air Reduction, 60 E. 42nd St., New York 17, N. Y.
Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Agile Corp., 5800 Hough Ave., Cleveland 3, O.
American Brass Co., The, Waterbury 88, Conn.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Ampco Metal Inc., Dept. S12, Milwaukee 4, Wis.
Arcos Corp., 1515 Locust St., Philadelphia 2, Pa.
Benedict-Miller Inc., 216 Clifford St., Newark 5, N. J.
Bridgeport Brass Co., Bridgeport 2, Conn.
Champion Rivet Co., The, 11200 Harvard Ave., Cleveland 5, O.
Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y.
General Electric Co., Schenectady 5, N. Y.
Handy & Harman, 82 Fulton St., New York 7, N. Y.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Hobart Brothers Co., The, Box ST 16, Troy, O.
Keystone Steel & Wire Co., Peoria 7, Ill.
Lincoln Electric Co., The, Cleveland 1, O.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Mid-States Equipment Co., Welding Div., 2425 S. Michigan Ave., Chicago 16, Ill.
Modern Engineering Co., Inc., 3400 Pine St., St. Louis 3, Mo.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Reid-Avery Co., The, Cleveland & Chesapeake Sts., Baltimore 22, Md.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Riverside Metal Co., Riverside, N. J.
Ryerson, Jos. T., & Son, Inc., 16th and Rockwell Sts., Chicago 80, Ill.
Seneca Wire & Mfg. Co., The, Fostoria, O.
United States Steel Supply Co., P. O. Box M M, Chicago 90, Ill.
Westinghouse Electric Corp., Dept. 7-N, E. Pittsburgh, Pa.
Wickwire Brothers, 189 Main St., Cortland, N. Y.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

WELL WATER SUPPLY SYSTEMS

Layne & Bowler, Inc., Memphis 8, Tenn.

WHEELS (Buffing and Polishing)

Chicago Wheel & Mfg. Co., Dept. ST, 1101 W. Monroe St., Chicago 7, Ill.

WHEELS (Car, Locomotive or Truck)

Bethlehem Steel Co., Bethlehem, Pa
Pittsburgh-Chicago.
Carnegie-Illinois Steel Corp., Pittsburgh—Chicago
Clark Equipment Co., Buchanan, Mich.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Standard Steel Works Div. of The Baldwin Locomotive Works, Philadelphia 42, Pa.

WINCHES (Electric)

Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.

WINCHES (Gasoline, Diesel)

Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y

WIRE (Alloy Steel) (*Also Stainless)

Allegheny Ludlum Steel Corp., Dept. S-47, Brackenridge, Pa.
*American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
*Carpenter Steel Co., 139 W. Bern St., Reading, Pa.
*Columbia Steel Co., San Francisco 6, Calif.
*Firth-Sterling Steel Co., McKeesport, Pa.
*Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
*Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
*Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
*Republic Steel Corp., Dept. ST, Cleveland 4, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Rustless Iron & Steel Corp., 3400 E. Chase St., Baltimore 13, Md.
Seneca Wire & Mfg. Co., Fostoria, O.

WIRE (Aluminum)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.

WIRE (Annealed, Bright, Galvanized, Tinned, Coppered)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Columbia Steel Co., San Francisco 6, Calif.
Continental Steel Corp., Kokomo, Ind.
Johnson Steel & Wire Co., Inc., Worcester 1, Mass.
Keystone Steel & Wire Co., Peoria 7, Ill.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
*Republic Steel Corp., Dept. St, Cleveland 4, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Wheeling Steel Corp., Wheeling, W. Va.
Wickwire Brothers, 189 Main St., Cortland, N. Y.
Wickwire Spencer Steel Div., The, Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

WIRE (Barb)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria 7, Ill.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.

WIRE (Brass, Bronze, Phosphor Bronze, Silicon Bronze, Copper or Nickel Silver)

American Brass Co., The, Waterbury 88, Conn.
Bridgeport Brass Co., Bridgeport 2, Conn.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Riverside Metal Co., Riverside, N. J.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Seymour Manufacturing Co., The, 51 Franklin St., Seymour, Conn.

WIRE (Cold Drawn)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Johnson Steel & Wire Co., Inc., Worcester 1, Mass.
Keystone Steel & Wire Co., Peoria 7, Ill.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N. Y.
Wickwire Spencer Steel Div., The, Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

WIRE (High Carbon)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Seneca Wire & Mfg. Co., The Fostoria, O.
Union Wire Rope Corp., 21st St. & Manchester Ave., Kansas City 3, Mo.
Ward Steel Co., 44 Farnsworth St., Boston 10, Mass.
Washburn Wire Co., 118th St. and Harlem River, New York 35, N. Y.
Wickwire Spencer Steel Div., The, Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

WIRE (Magnet)

Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.

WIRE (Music)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Johnson Steel & Wire Co., Inc., Worcester 1, Mass.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Ward Steel Co., 44 Farnsworth St., Boston 10, Mass.
Washburn Wire Co., 118th St. and Harlem River, New York 35, N. Y.
Wickwire Spencer Steel Div., The, Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

WIRE (Round, Flat, Square, Special Shapes)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Caine Steel Co., 1820 N. Central Ave., Chicago 39, Ill.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Johnson Steel & Wire Co., Inc., Worcester 1, Mass.
Keystone Steel & Wire Co., Peoria 7, Ill.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Washburn Wire Co., 118th & Harlem River, New York 35, N. Y.
Wickwire Spencer Steel Div., The, Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.
Youngstown Sheet & Tube Co., The, Youngstown 1, O.

WIRE (Spring)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Barnes, Wallace, Co., The, Div. Associated Spring Corp., Bristol, Conn.
Bethlehem Steel Co., Bethlehem, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Keystone Steel & Wire Co., Peoria 7, Ill.
Muehlhausen Spring Corp., 921 Michigan Ave., Logansport, Ind.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Union Wire Rope Corp., 21st and Manchester Ave., Kansas City 3, Mo.
Ward Steel Co., 44 Farnsworth St., Boston 10, Mass.
Washburn Wire Co., 118th St. & Harlem River, New York 35, N. Y.
Wickwire Spencer Steel Div., The, Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.
Youngstown Sheet & Tube Co., Youngstown 1, O.

WIRE (Stapling)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria 7, Ill.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Wickwire Spencer Steel Div., The, Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

WIRE (Welding)—See WELDING RODS OR WIRE

WIRE AND CABLE (Electric)

Aluminum Co. of America, 2112 Gulf Bldg., Pittsburgh 19, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O
Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.
Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
General Electric Co., Bridgeport, 2, Conn.
Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.
Roebling's, John A., Sons Co., Trenton 2, N. J.

WIRE CLOTH

Cyclone Fence Div., American Steel & Wire Co., Waukegan, Ill.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Rolock, Inc., 1380 Kings Highway, Fairfield, Conn.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Wickwire Brothers, 189 Main St., Cortland, N. Y.
Wickwire Spencer Steel Div., The, Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

WIRE COILING TOOLS (Cemented Carbide)

Firth-Sterling Steel Co., McKeesport, Pa.
Kennametal, Inc., 200 Lloyd Ave., Latrobe, Pa.

WIRE FORMS, SHAPES AND SPECIALTIES

Accurate Spring Mfg. Co., 3823 W. Lake St., Chicago 24, Ill.
American Chain Div. American Chain & Cable Co., Inc., York, Pa
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Barnes, Wallace, Co., The, Div. Associated Spring Corp., 97 Main St., Bristol, Conn.
Bethlehem Steel Co., Bethlehem, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
Keystone Steel & Wire Co., Peoria 7, Ill.
Muehlhausen Spring Corp., 921 Michigan Ave., Logansport, Ind.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Roebling's. John A., Sons Co., Trenton 2, N. J.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Wickwire Spencer Steel Div., The, Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

WIRE FORMING MACHINERY

Nilson, A. H., Machine Co., The, 1525 Railroad St., Bridgeport 2, Conn.
Wean Engineering Co., Inc., The, Warren, O.

WIRE MILL EQUIPMENT

Farrel-Birmingham Co., Inc., Ansonia, Conn.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Lewis Machine Co., 3450 E. 76th St., Cleveland 4, O.
Morgan Construction Co., Worcester 5, Mass.
Shuster, F. B., Mfg. Co., Inc., The, New Haven 9, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

WIRE NAILS—See NAILS

WIRE PRODUCTS (*Also Stainless)

American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
*Industrial Steels, Inc., 246-250 Bent St., Cambridge 41, Mass.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Keystone Steel & Wire Co., Peoria 7, Ia.
Leschen, A., & Sons Rope Co., 5909 Kennerly Ave., St. Louis 12, Mo.
Muehlhausen Spring Corp., 921 Michigan Ave., Logansport, Ind.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
*Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Tennessee Coal Iron & Railroad Co., Brown-Marx Bldg., Birmingham 2, Ala.
Wickwire Brothers, Inc., 189 Main St., Cortland, N. Y.
Wickwire Spencer Steel Div., The, Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

WIRE ROPE

American Cable Div. of American Chain & Cable Co., Inc., Wilkes-Barre, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., San Francisco 6, Calif.
Craine-Schrage Steel Co., 1025 S. Oakwood Ave., Detroit 25, Mich.
Hazard Wire Rope Div. of American Chain & Cable Co. Inc., Wilkes-Barre, Pa.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Leschen, A., & Sons Rope Co., 5909 Kennerly Ave., St. Louis 12, Mo
Macwhyte Co., 2912 14th Ave., Kenosha, Wis.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Union Wire Rope Corp., 21st and Manchester Ave., Kansas City 3, Mo.
Wickwire Spencer Steel Div., The, Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

WIRE ROPE FITTINGS

American Cable Div. of American Chain & Cable Co., Wilkes-Barre, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O.
Bethlehem Steel Co., Bethlehem, Pa.
Hazard Wire Rope Div., of American Chain & Cable Co., Inc., Wilkes-Barre, Pa.
Leschen, A., & Sons, Rope Co., 5909 Kennerly Ave., St. Louis 12, Mo.
Macwhyte Co., 2912 14th Ave., Kenosha, Wis.
Roebling's, John A., Sons Co., Trenton 2, N. J.

WIRE ROPE SLINGS

American Cable Div. American Chain & Cable Co., Inc., Wilkes Barre, Pa.
American Steel & Wire Co., Rockefeller Bldg., Cleveland 13, O
Bethlehem Steel Co., Bethlehem, Pa.
Hazard Wire Rope Div., American Chain & Cable Co., Inc., Wilkes-Barre, Pa.
Leschen, A., & Sons Rope Co., 5909 Kennerly Ave., St. Louis 12, Mo.
Macwhyte Co., 2912 14th Ave., Kenosha, Wis.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Union Wire Rope Corp., 21st & Manchester Ave., Kansas City 3, Mo.
Wickwire Spencer Steel Div., The, Colorado Fuel & Iron Co., 500 Fifth Ave., New York 18, N. Y.

WIRE STRAIGHTENING AND CUTTING MACHINERY

Federal Foundry Supply Co., The, 4600 E. 71st St., Cleveland 5, O.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh 30, Pa.
Lewis Machine Co., 3450 E. 76th St., Cleveland 4, O.
Shuster, F. B., Mfg. Co., Inc., New Haven 9, Conn.

WORK REST BLADES (Centerless Grinder)

Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.

WRENCHES (Drop Forged)

Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

WRENCHES (Torque)

Williams, J. H., & Co., 400 Vulcan St., Buffalo 7, N. Y.

X-RAY EQUIPMENT and SUPPLIES

Eastman Kodak Co., 343 State St., Rochester 4, N. Y.
General Electric X-Ray Corp., 175 W. Jackson Blvd., Chicago 4, Ill.
Westinghouse Electric Corp., Baltimore 3, Md.

ZINC

New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.

ZINC ALLOYS

New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.

ZINC OXIDE

Anaconda Sales Company, 25 Broadway, New York 4, N. Y.
New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.

ZINC (Rolled Sheets, Strip, Coils)

New Jersey Zinc Co., 160 Front St., New York 7, N. Y.

ZINC SLABS

Anaconda Sales Company, 25 Broadway, New York 4, N. Y.
New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.

ZIRCONIUM METAL AND ALLOYS

Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Metal Hydrides, Inc., 12-24 Congress St., Beverly, Mass.

Current Advertisers in STEEL

A

Abrasive Products, Inc.,
511 Pearl St.,
South Braintree, Mass.
Accurate Spring Mfg. Co.,
3823 W. Lake St., Chicago 24, Ill.
Ace Mfg. Corp.,
1211 E. Erie Ave.,
Philadelphia 24, Pa.
Acme Plating Co., The,
1563 E. 21st St.,
Cleveland 14, O.
Adams, R. P. Co., Inc.,
75 Chicago St., Buffalo, 4, N. Y.
Advance Foundry Co., The,
100 Parnell Ave., Dayton 3, O.
Advance Pressure Castings Inc.,
42 N. 15th St., Brooklyn 22, N. Y.
Aetna-Standard Engineering Co., The, Home Savings Bank Bldg.,
Youngstown 1, O.
Agaloy Tubing Co.,
1027 Newark Ave.,
Elizabeth 3, N. J.
Air Hydraulics Div. Beyer Machine Co., Jackson, Mich.
Air Reduction,
60 E. 42nd St.,
New York 17, N. Y.
Aircraft & Diesel Equipment Corp.,
4401 N. Ravenswood Ave.,
Chicago 40, Ill.
Aircraft Mechanics, Inc.,
Nevada St.,
Colorado Springs, Colo.
Ajax Electrothermic Corp.,
Ajax Park, Trenton 5, N. J.
Ajax Flexible Coupling Co.,
4 English St., Westfield, N. Y.
Alan Wood Steel Co.,
Conshohocken, Pa.
Albert, L., & Son,
Whitehead Rd., Trenton, N. J.
Aldrich Pump Co., The,
8 Pine St., Allentown, Pa.
Alemite Div., Stewart-Warner Corp.,
1828 W. Diversey Pkwy.,
Chicago 14, Ill.
Allegheny Ludlum Steel Corp.,
Oliver Bldg., Pittsburgh 22, Pa.
(Brackenridge, Pa.)
Allen-Bradley Co.,
1316 S. Second St.,
Milwaukee 4, Wis.
Alliance Machine Co., The,
Alliance, O.
Allied Products Corp.,
4646 Lawton St.,
Detroit 8, Mich.
Allis-Chalmers Mfg. Co.,
Milwaukee 1, Wis.
Alloy Metal Abrasive Co.,
311 W. Huron St.,
Ann Arbor, Mich.
Alloy Rods Co.,
York, Pa.
Aluminum Co. of America,
2112 Gulf Bldg.,
Pittsburgh 19, Pa.
Aluminum Industries, Inc.,
2438 Beekman St.,
Cincinnati 25, O.
American Agile Corp.,
5800 Hough Ave., Cleveland 3, O.
American Air Filter Co., Inc.,
443 Central Ave.,
Louisville 8, Ky.
American Brass Co., The,
Waterbury 88, Conn.
American Bridge Co.,
Frick Bldg., Pittsburgh 19, Pa.
American Broach & Machine Co.,
Ann Arbor, Mich.
American Cast Iron Pipe Co.,
9030 N. 16th St.,
Birmingham 2, Ala.
American Chain & Cable Co., Inc.
Bridgeport 2, Conn.
American Chemical Paint Co.,
Ambler, Pa.
American Crayon Co.,
Sandusky, O.
American Flexible Coupling Div.,
J. A. Zurn Mfg. Co., 18th & Pittsburgh Aves., Erie, Pa.
American Foundry Equipment Co.,
509 S. Byrkit St., Mishawaka, Ind.
American Gas Association (Industrial Gas Section) Graybar Bldg.,
New York 17, N. Y.
American Hot Dip Galvanizer's Association, 1611 First National Bank Bldg., Pittsburgh 22, Pa.
American Institute of Bolt, Nut & Rivet Manufacturers, 1550 Hanna Bldg., Cleveland 15, O.
American Magnesium Corp.,
1721 Gulf Bldg.,
Pittsburgh 19, Pa.
American Metal Hose Branch of the American Brass Co.,
Waterbury 88, Conn.
American MonoRail Co., The
13102 Athens Ave.,
Cleveland 7, O.
American Nickeloid Co.,
1310 Second St., Peru, Ill.
American Petrometal Corp.,
Broadway at 11th St.,
Long Island City 2, N. Y.
American Photocopy Equipment Co.,
2849 N. Clark St., Chicago 14, Ill.
American Pipe Bending Machine Co., Inc., 11 Furnace St.,
Poultney, Vt.
American Pulverizer Co.,
1539 Macklind Ave.,
St. Louis 10, Mo.
American Roller Bearing Co.,
420 Melwood St.,
Pittsburgh 13, Pa.
American Rolling Mill Co., The,
2981 Curtis St., Middletown, O.
American Screw Co.,
Providence 1, R. I.
American Shear Knife Co.,
P. O. Box 355, Homestead, Pa.
American Solder & Flux Co.,
2153 E. Norris St.,
Philadelphia 25, Pa.
American Steel & Wire Co.,
Rockefeller Bldg.,
Cleveland 13, O.
Amon-Schulte Co.,
321 Ohio River Blvd.,
Emsworth, Pittsburgh 2, Pa.
Ampco Metal Inc.,
Dept. S12, Milwaukee 4, Wis.
Amsler-Morton Co., The., Div. of Union Mining Co., Fulton Bldg.,
Pittsburgh 22, Pa.
Anaconda Wire & Cable Co.,
25 Broadway, New York 4, N. Y.
Anker-Holth Mfg. Co.,
2723 Conners St.,
Port Huron, Mich.
Apollo Steel Co.,
2243-2244 Oliver Bldg.,
Pittsburgh 22, Pa.
Arcos Corp.,
1515 Locust St.,
Philadelphia 2, Pa.
Armstrong-Blum Mfg. Co.,
5700 Bloomingdale Ave.,
Chicago 39, Ill.
Associated Engineers, Inc.,
230 E. Berry St.,
Fort Wayne 2, Ind.
Atlantic Gear Works,
200 Lafayette St.,
New York 12, N. Y.
Atlantic Steel Products Co.,
1330 N. 30th St.,
Philadelphia 21, Pa.
Atlas Car & Mfg. Co., The,
1100 Ivanhoe Road,
Cleveland 10, O.
Atlas Drop Forge Co.,
Lansing 2, Mich.
Atlas Lumnite Cement Co., Dept. S,
Chrysler Bldg.,
New York 17, N. Y.
Atlas Tool & Designing Co.,
Castor & Kensington Aves.,
Philadelphia 24, Pa.
Austenal Laboratories, Inc.,
5932 S. Wentworth Ave.,
Chicago 21, Ill.
Avondale Marine Ways, Inc.,
Westwego, La.

B

Babcock & Wilcox Co., The.
85 Liberty St., New York 6, N. Y.
Babcock & Wilcox Co., The,
Refractories Div., 85 Liberty St.,
New York 6, N. Y.
Babcock & Wilcox Tube Co., The,
Beaver Falls, Pa.
Bailey, Wm. M., Co.,
702 Magee Bldg.,
Pittsburgh 22, Pa.
Baker Bros. Inc.,
Post & Westlake Sts.,
Toledo 10, O.
Baker, J. E., Co., The.
114 N. George St., York, Pa.
Baker-Raulang Co., The,
2167 W 25th St.,
Cleveland 13, O.
Baldwin Southwark Div., Baldwin Locomotive Works, The,
Paschall P. O., Phila. 42, Pa.
Bantam Bearings Div., Torrington Co., The, South Bend 21, Ind.
Barber-Colman Co., 150 Loomis St.,
Rockford, Ill.
Barnes, Wallace, Co., The.
97 Main St., Bristol, Conn.
Bartlett, C. O., & Snow Co., The
6200 Harvard Ave., Cleveland 5, O.
Basic Refractories, Inc.,
Hanna Bldg., Cleveland 15, O.
Basler, E. J., Co.,
231 S. LaSalle St.,
Chicago 4, Ill.
Bay City Forge Co.,
W. 19th & Cranberry Sts.,
Erie, Pa.
Bay State Abrasive Products Co.,
Westboro, Mass.
Beall Tool Co.,
East Alton, Ill.
Bearings Co. of America,
Lancaster, Pa.
Beatty Machine & Mfg. Co.,
150th & Oak Sts., Hammond, Ind.
Bedford Fdry. & Machine Co.,
Bedford, Ind.
Bellows Co., The,
869 Tallmadge Ave., East,
Akron 10, O.
Belmont Iron Works,
22nd St. & Washington Ave.,
Philadelphia 46, Pa.
Benedict-Miller, Inc.,
216 Clifford St., Newark 5, N. J.
Bethlehem Steel Co.,
Bethlehem, Pa.
Bigwood, Joshua, & Son Ltd.,
Wolverhampton, England.
Birdsboro Steel Fdry. & Mach. Co.,
Co., Birdsboro, Pa.
Bison Forge Co.,
119 Manitoba St., Buffalo 6. N. Y.
Bissett Steel Co., The.
945 E. 67th St., Cleveland 8, O.
Black Mfg. Co., 1416-1428 W. Baltimore St., Baltimore 23, Md.
Blanchard Machine Co., The,
64 State St., Cambridge 39, Mass.
Blaw-Knox Co.,
Blawnox, Pa.
Bliss, E. W., Co.,
53rd St. & First Ave.,
Brooklyn 32, N. Y.
Bliss & Laughlin, Inc.,
Harvey, Ill.
Bohn Aluminum & Brass Corp.,
Lafayette Bldg., Detroit 26, Mich.
Bokum Tool Co.,
14775 Wildemere Ave.,
Detroit 21, Mich.
Boss Bolt & Nut Co. Div. of The Lock Nut Corp. of America,
3403 W. 47th St., Chicago 32, Ill.
Boston Woven Hose & Rubber Co.,
P.O. Box 1071, Boston 3. Mass.
Brasco Mfg. Co., Harvey, Ill.
Bridgeport Brass Co.,
Bridgeport 2, Conn.
Bridgewater Screw Products Co.,
Bridgewater, Mass.
Bristol Co., The, Waterbury 91,
Conn.
Brooke, E. & G., Iron Co.,
Birdsboro, Pa.
Brosius, Edgar E. Co.,
Sharpsburg P. O.,
Pittsburgh 15, Pa.
Brown & Sharpe Mfg. Co.,
Providence 1, R. I.
Browning, Victor R., Co., Inc.,
Willoughby, Ohio.
Bryant Chucking Grinder Co.,
257 Clinton St., Springfield, Vt.
Bryant Machinery & Engineering Co., 400 W. Madison St.,
Chicago 6, Ill.
Buffalo Bolt Co.,
101 East Ave.,
N. Tonawanda, N. Y.
Buffalo Forge Co.,
158 Mortimer St., Buffalo 5. N. Y.
Bullard Co., The.
Bridgeport 2, Conn.
Bundy Tubing Co.,
10951 Hern Ave.,
Detroit 13, Mich.
Bunting Brass & Bronze Co., The,
715 Spencer St., Toledo 1, O.
Burt Manufacturing Co., The,
400 S. High St., Akron 11, O.

C

Cadman, A. W., Mfg. Co.,
28th & Smallman Sts.,
Pittsburgh 22, Pa.
Caine Steel Co., 1820 N. Central Ave., Chicago 39, Ill.
Camcar Products Co., Rockford, Ill.
Canton Drop Forging & Mfg. Co.,
The. Canton 2, O.
Carboloy Co., Inc.,
11141 E. 8 Mile Ave.,
Detroit 32, Mich.
Carborundum Co., The,
Buffalo & 18th Sts., Niagara Falls, N. Y.
Cardox Corp.,
Bell Bldg., Chicago 1, Ill.
Carnegie-Illinois Steel Corp.,
327 Carnegie Bldg.,
Pittsburgh 30, Pa.
Carpenter Steel Co.,
139 W. Bern St., Reading, Pa.
Cattie, Jos. P., & Bros.,
Gaul & Letterly Sts.,
Philadelphia 25, Pa.
Ceilcote Co.,
750 Rockefeller Bldg.,
Cleveland 13, O.
Century Electric Co.,
1806 Pine St., St. Louis 3, Mo.
Chambersburg Engineering Co.,
Chambersburg, Pa.
Champion Rivet Co., The,
11200 Harvard Ave.,
Cleveland 5, O.
Chandler Products Corp.,
Euclid 17, O.
Chicago Metal Hose Corp.,
1315 S. Third St., Maywood, Ill.
Chicago Perforating Co.,
2443 W. 24th Pl., Chicago 8, Ill.
Chicago Rawhide Mfg. Co.,
1308 Elston Ave., Chicago 22, Ill.
Chicago Screw Co., The,
1026 S. Homan Ave.,
Chicago 24, Ill.
Chicago Tramrail Co.,
2912 W. Carroll Ave.,
Chicago 12, Ill.
Chicago Wheel & Mfg. Co.,
1101 W. Monroe St., Dept. ST,
Chicago 7, Ill.
Chisholm-Moore Hoist Corp.,
118 Fremont Ave.,
Tonawanda, N. Y.
Chromium Mining & Smelting Corp., Ltd., Canada Cement Co. Bldg., Montreal, Quebec.
Cincinnati Bickford Tool Co.,
3220 Forrer Ave.,
Cincinnati 9, O.
Cincinnati Milling Machine Co. and Cincinnati Grinders, Inc.,
Oakley Station, Cincinnati 9, O.
Cincinnati Planer Co.,
Cincinnati 9, O.
Cincinnati Shaper Co., The.
Hopple, Garrard & Elam Sts.,
Cincinnati 25, O.
Cities Service Companies,
70 Pine St., New York 5, N. Y.
Clark Controller Co., The,
1146 E. 152nd St.,
Cleveland 10, O.
Clark Equipment Co.,
Buchanan, Mich.
Clark Tructractor Div., Clark Equipment Co., Battle Creek, Mich.
Cleveland Automatic Machine Co.,
The, 2269 Ashland Rd.,
Cleveland 3, O.
Cleveland Chain & Mfg. Co., The,
Broadway & Henry Rd.,
Cleveland 5, O.
Cleveland-Cliffs Iron Co., The,
Union Commerce Bldg.,
Cleveland 14, O.
Cleveland Crane & Engineering Co.,
The, 1125 E. 283rd St.,
Wickliffe, O.
Cleveland Metal Abrasive Co., The,
880 E. 67th St., Cleveland 8, O.
Cleveland Pneumatic Tool Co., The,
3781 E. 77th St., Cleveland 5, O.
Cleveland Punch & Shear Works Co., The, 3917 St. Clair Ave.,
Cleveland 14, O.
Cleveland Tramrail Div.,
1125 E. 283rd St.,
Wickliffe, O.
Cleveland Twist Drill Co., The,
1242 E. 49th St., Cleveland 14, O
Cleveland Welding Co., The,
W. 117th St. & Berea Rd.,
Cleveland 7, O.
Cleveland Worm & Gear Co., The.
3270 E. 80th St., Cleveland 4, O.
Climax Molybdenum Co.,
500 Fifth Ave.,
New York 18, N. Y.
Cold Metal Products Co., The,
2131 Wilson Ave.,
Youngstown 1, O.
Colonial Broach Co.,
P. O. Box #37, Harper Sta.
Detroit 13, Mich.
Columbus-McKinnon Chain Corp.,
Chisholm-Moore Hoist Corp.,
118 Fremont Ave.,
Tonawanda, N. Y.
Commercial Metals Treating, Inc.,
177 S. St. Clair St., Toledo 1, O.
Cone Automatic Machine Co., Inc.,
Windsor, Vt.

Consolidated Machine Tool Corp., 565 Blossom Road, Rochester 10, N. Y.
Consolidated Vultee Aircraft Corp., 3301 Pacific Highway, San Diego 1, Cal.
Continental Fdry. & Machine Co., East Chicago, Ind.
Continental Screw Co., New Bedford, Mass.
Continental Steel Corp., Kokomo, Ind.
Cook Electric Co., 2700 N. Southport Ave., Chicago 14, Ill.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Copperweld Steel Co., Warren, O.
Corbin Screw Corp., New Britain, Conn.
Covert Mfg. Co., Heyman Machine Div., Troy, N. Y.
Cowles Tool Co., 2086 W. 110th St., Cleveland 2, O.
Crane Packing Co., 1879 Cuyler Ave., Chicago 13, Ill.
Crescent Truck Co., 1100 Willow St., Lebanon, Pa.
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
Cross Co., The, 3250 Bellevue Ave., Detroit 7, Mich.
Cullen-Friestedt Co., 1308 S. Kilbourn Ave., Chicago 23, Ill.
Cunningham. M. E., Co., 172 E. Carson St., Pittsburgh 19, Pa.
Curtis Pneumatic Machinery Div., Curtis Mfg. Co., 1996 Kienlen Ave., St. Louis 20, Mo.
Cutler-Hammer, Inc., 1211 St. Paul Ave., Milwaukee 1, Wis.

D

Danly Machine Specialties, Inc., 2100 S. 52nd Ave., Chicago 50, Ill.
Darwin & Milner, Inc., 1260 W. 4th St., Cleveland 13, O.
Davenport-Besler Corp., Davenport, Iowa
Davis Brake Beam Co., Laurel Ave., & P. R. R., Johnstown, Pa.
Davis Keyseater Co., 399 Exchange St., Rochester 8, N. Y.
Deepfreeze, Div. of Motor Products Corp., 2309-7 Davis St., N. Chicago, Ill.
DeLaval Steam Turbine Co., Trenton 8, N. J.
Delco Products Div. General Motors Corp., 329 E. First St., Dayton 1, O.
Dempster Brothers, Inc., 294 Shea Rd., Knoxville 17, Tenn.
Denison Engineering Co., The, 1163 Dublin Rd., Columbus 16, O.
Despatch Oven Co., 619 Eighth St. S.E., Minneapolis 14, Minn.
Detrex Corporation, 13029 Hillview Ave., Detroit 4, Mich.
Detroit Electric Furnace Div., Kuhlman Electric Co., Bay City, Mich.
Detroit Power Screwdriver Co., 2813 W. Fort St., Detroit 16, Mich.
Detroit Sheet Metal Works, 1300 Oakman Blvd., Detroit 6, Mich.
Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Detroit Tap & Tool Co., 8432 Butler St., Detroit 11, Mich.
DeWalt Products Corp., Fountain Ave., Lancaster, Pa.
Diamond Mfg. Co., Box 32, Wyoming, Pa.
Differential Steel Car Co., Findlay, O.
Disston, Henry, & Sons, Inc., 1126 Tacony, Philadelphia 35, Pa.
DoAll Company, The, 231 N. Laurel Ave., Des Plaines, Ill.
Dodge Mfg. Corp., Mishawaka, Ind.
Donaldson Co. Inc., 666 Pelham Blvd., St. Paul 4, Minn.
Dow Chemical Co., The, Midland, Mich.
Dow Corning Corp., Midland, Mich.
Dresser Mfg. Div., Dresser Industries, Bradford, Pa.
Drop Forging Association, Hanna Bldg., Cleveland 15, O.
Duffin Iron Co., 37 W. Van Buren St., Chicago 5, Ill.
Dulien Steel Products, Inc., 1008 Western Ave., Seattle 4, Wash.
duPont de Nemours, E. I., & Co., Inc., Wilmington 98, Del.

E

Eastern Stainless Steel Co., 122 Rolling Mill Ave., Baltimore 3, Md.
Eastman Kodak Co., 343 State St., Rochester 4, N. Y.
Easton Car & Construction Co., 10 East 40th St., Easton, Pa.
Eberhardt-Denver Co., 1418 W. Colfax Ave., Denver 4, Colo.
Economy Co., Inc., 49 Vanderbilt Ave., New York 17, N. Y.
Edison Storage Battery Div., Edison, Thomas A., Inc., West Orange, N. J.
Electric Controller & Mfg. Co., The, 2698 E. 79th St., Cleveland 4, O.
Electric Eye Equipment Co., 11 W. Fairchild St., Danville, Ill.
Electric Furnace Co., The, 440 W. Wilson St., Salem, O.
Electric Storage Battery Co., The, 19th St. and Allegheny Ave., Philadelphia 32, Pa.
Electro Metallurgical Co., 30 E. 42nd St., New York 17, N. Y.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Elwell-Parker Electric Co., The, 4501 St Clair Ave., Cleveland 14, O.
Enterprise Galvanizing Co., Almond & E. Firth Sts., Philadelphia 25, Pa.
Erdle Perforating Co., 171 York St., Rochester 11, N. Y.
Erie Foundry Co., Erie, Pa.
Erie Steel Construction Co. 961 Geist Rd., Erie, Pa.
Euclid Crane & Hoist Co., The, 1365 Chardon Rd., Euclid, O.
Eureka Fire Brick Works, 1100 B. F. Jones Law Bldg., Pittsburgh 19, Pa.
Eutectic Welding Alloys Co., 40 Worth St., New York 13, N. Y.
Ex-Cell-O Corp., 1228 Oakman Blvd., Detroit 9, Mich.

F

Fafnir Bearing Co., New Britain, Conn.
Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Ill.
Fairfield Mfg. Co., 303 S. Earl Ave., LaFayette, Ind.
Farrel-Birmingham Co. Inc., Ansonia, Conn.
Farval Corp., The, 3270 E. 80th St., Cleveland 4, O.
Fate-Root-Heath Co., Plymouth, O.
Federal Electric Products Co., 50 Paris St., Newark 5, N. J.
Federal Foundry Supply Co., The, 4600 E. 71st St., Cleveland 5, O.
Federal Machine & Welder Co., 202 Dana St., Warren, O.
Federal Telephone & Radio Corp., Div. International Telephone & Telegraph Corp., 32 Central Ave., Newark 1, N. J.
Ferry Cap & Set Screw Co., 2151 Scranton Rd., Cleveland 13, O.
Finkl, A., & Sons Co., 2011 N. Southport Ave., Chicago 14, Ill.
Firth-Sterling Steel Co., McKeesport, Pa.
Fitchburg Grinding Machine Corp., Fitchburg, Mass.
Fitzsimons Co., The, Youngstown 8, O.
Follansbee Steel Corp., Third & Liberty Sts., Pittsburgh 30, Pa.
Foote, Brad, Gear Works, 1309 S. Cicero Ave., Cicero 50, Ill.
Fort Pitt Bridge Works, Keystone Hotel, Pittsburgh 22, Pa.
Foster, Frank B., 829 Oliver Bldg., Pittsburgh 22, Pa.
Foster, L. B., Co., Inc., P. O. Box 1647, Pittsburgh, Pa.
Fostoria Pressed Steel Corp., The, Fostoria, O.
Frasse, Peter A., & Co., Inc., 17 Grand St., New York 13, N. Y.
French & Hecht Inc., 525 E. 3rd St., Davenport, Ia.
Fuller Brush Co., The, Industrial Div., 3582 Main St., Hartford 2, Conn.

G

Galland-Henning Mfg .Co., 2747 S. 31st St., Milwaukee 7, Wis.
Garrett, George K., Co., Inc., 1421 Chestnut St., Philadelphia 2, Pa.
Gates Rubber Co., The, 999 S. Broadway, Denver 17, Colo.
General Abrasive Co., Inc., College Ave. & Hyde Park Blvd., Niagara Falls, N. Y.
General American Transportation Corp., 514C Graybar Bldg., New York 17, N. Y.
General Blower Co., Morton Grove, Ill.
General Chemical Co., 40 Rector St., New York 6, N. Y.
General Electric Co., Schenectady 5, N. Y.
General Electric Co. (Air Conditioning & Commercial Refrigeration Dept., Bloomfield, N. J.
General Electric Co., Bridgeport 2, Conn.
General Electric X-Ray Corp., 175 W. Jackson Blvd., Chicago 4, Ill.
General Engineering & Mfg. Co., 1523 S. 10th St., St. Louis 4, Mo.
General Steel Warehouse Co., Inc., 1830 N. Kostner Ave., Chicago 39, Ill.
Gerding Bros., 5 E. Third St., Cincinnati 2, O.
Gisholt Machine Co., 1217 E. Washington St., Madison 3, Wis.
Gits Brothers Mfg. Co., 1836 S. Kilbourne Ave., Chicago 23, Ill.
Globe Brick Co., The, East Liverpool, O.
Goodrich, B. F. Co., The, Akron 18, O.
Gordon, Claud S., Co., 3000 S. Wallace St., Chicago 16, Ill.
Granite City Steel Co., Granite City, Ill.
Grant Gear Works, 2nd & B Sts., Boston 27, Mass.
Graton & Knight Co., 322 Franklin St., Worcester 4, Mass.
Gray-Mills Co., 1948-52 Ridge Ave., Evanston, Ill.
Great Lakes Steel Corp., Tecumseh Rd., Detroit 18, Mich.
Greenfield Tap & Die Corp., Greenfield, Mass.
Greenlee Brothers & Co., 1927 Mason Ave., Rockford, Ill.
Greenspon's, Jos., Son Pipe Corp., National Stock Yards, St. Clair County, Ill.
Gruendler Crusher & Pulverizer Co., 2915-17 N. Market St., St. Louis 6, Mo.
Guibert Steel Co., P. O. Box 1837, Pittsburgh 30, Pa.
Gulf Oil Corp., Gulf Bldg., Pittsburgh 30, Pa.

H

Hagan, George J., Co., 2400 E. Carson St., Pittsburgh 3, Pa.
Hallden Machine Co., The, Thomaston, Conn.
Hardy & Harman 82 Fulton St., New York 7, N. Y.
Hanlon-Gregory Galvanizing Co., 5515 Butler St., Pittsburgh 1, Pa.
Hanna Engineering Works, 1765 Elston Ave., Chicago 22, Ill.
Hanna Furnace Corp., The, Penobscot Bldg., Detroit 26, Mich.
Hannifin Mfg. Co., 621-631 S. Kolmar Ave., Chicago 24, Ill.
Hansen Mfg. Co., 1786 E. 27th St., Cleveland 14, O.
Hanson-Van Winkle-Munning Co., Matawan, N. J.
Harbison-Walker Refractories Co. 1800 Farmers Bank Bldg., Pittsburgh 22, Pa.
Harnischfeger Corp., 4411 W. National Ave., Milwaukee 14, Wis.
Harper Electric Furnace Corp., 1470 Buffalo Ave., Niagara Falls, N. Y.
Harper, H. M., Co., The, 2646 Fletcher St., Chicago 18, Ill.
Harrington & King Perforating Co., The, 5634 Fillmore St., Chicago 44, Ill.
Harris Products Co., 634 Huron Rd., Cleveland 15, O.
Harrisburg Steel Corp., Harrisburg, Pa.
Haskelite Mfg. Corp., Grand Rapids 2, Mich.
Haskins, R. G., Co., 615 S. California Ave., Chicago 12, Ill.
Hassall, John, Inc., 402 Oakland St., Brooklyn 22, N. Y.
Haynes Stellite Corp., Harrison & Lindsay Sts., Kokomo, Ind.
Hays Corp., The, 960 Eighth St., Michigan City, Ind
Hazard Wire Rope Div., Wilkes-Barre, Pa.
Heald Machine Co., The, Worcester 6, Mass.
Heckethorn Mfg. & Supply Co., Littleton, Colo.
Heil Engineering Co., 12903 Elmwood Ave., Cleveland 11, O.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Heppenstall Co., Dept. T.P., 4620 Hatfield St., Pittsburgh 1, Pa
Hercules Powder Co., Inc., Wilmington 99, Del.
Hetz Construction Co., Warren, O.
Hevi Duty Electric Co., 4212 W. Highland Blvd., Milwaukee 1, Wis.
Hindley Mfg. Co., Valley Falls, R. I.
Hobart Bros. Co., The, Box St. 16, Troy, O.
Holcroft & Co., 6545 Epworth Blvd., Detroit 10, Mich.
Holden, A. F., Co., The, P. O. Box 1898, New Haven 8, Conn.
Holliday, W. J., & Co., Hammond, Ind.
Homestead Valve Mfg. Co., P. O. Box 22, Coraopolis, Pa
Honan-Crane Corp., 210 S. Wabash Ave., Lebanon, Ind.
Horsburgh & Scott Co., The, 5112 Hamilton Ave., Cleveland 14, O.
Houghton, E. F., & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Hubbard, M. D., Spring Co., 425 Central Ave., Pontiac 12, Mich.
Huck Mfg. Co., 2480 Bellevue Ave., Detroit 7, Mich.
Hughes-Keenan Co., The, 585 Newman St., Mansfield, O.
Huther Bros. Saw Mfg. Co., Inc., 1290 University Ave., Rochester, N. Y.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Hyde Park Fdry & Machine Co., Hyde Park, Pa.
Hydraulic Machinery Inc., 12825 Ford Road, Dearborn, Mich.
Hydraulic Press Mfg. Co., The, Mt. Gilead, O.
Hydropress, Inc., 570 Lexington Ave., New York 22, N. Y.
Hy-Test Div., International Shoe Co., 1509 Washington Ave., St. Louis 3, Mo.

I

Illinois Clay Products Co., 214 Barber Bldg., Joliet, Ill.
Illinois Gear & Machine Co., 2108 N. Natchez Ave., Chicago 35, Ill.
Illinois Tool Works, 2501 N. Keeler Ave., Chicago 39, Ill.
Independent Engineering Co., 105 W. Second St., O'Fallon, Ill.
Independent Pneumatic Too. Co., 600 W. Jackson Blvd., Chicago 6, Ill.

Industrial Brownhoist Corp., Bay City, Mich.
Industrial Gear Mfg. Co., 4545 E. Van Buren St., Chicago 24, Ill.
Industrial Oven Engineering Co., The, 11621 Detroit Ave., Cleveland 2, O.
Industrial Steels Inc., 246-250 Bent St., Cambridge 41, Mass.
Ingalls Iron Works Co., The, Birmingham 2, Ala.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Ingersoll Steel & Disc Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
International Graphite & Electrode Corp., St. Marys, Pa.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
International Rustproof Corp., 12507-15 Plover Ave., Cleveland 7, O.
Iron & Steel Products, Inc., Hegewisch Sta., Chicago 33, Ill.
Irwin Mfg. Co., Inc., Carland, Pa.

J

Jackson Iron & Steel Co., Jackson, O.
Jaeger Machine Co., The, 550 W. Spring St., Columbus 15, O.
James, D. O., Mfg. Co., 1140 W. Monroe St., Chicago 7, Ill.
Japan Co., The, 5103 Lakeside Ave., Cleveland 14, O.
Jeffrey Mfg. Co., The, 889-99 N. Fourth St., Columbus 16, O.
Jessop Steel Co., 584 Green St., Washington, Pa.
Johns-Manville Corp., 22 E. 40th St., New York 16, N. Y.
Johnson Bronze Co., 550 S. Mill St., New Castle, Pa.
Johnson Gas Appliance Co., 573 "E" St., N. W., Cedar Rapids, Iowa.
Johnson Steel & Wire Co., Inc., Worcester 1, Mass.
Johnston & Jennings Co., The, 877 Addison Rd., Cleveland 14, O.
Jones & Lamson Machine Co., Springfield, Vt.
Jones & Laughlin Steel Corp., Jones & Laughlin Bldg., Pittsburgh 30, Pa.
Jones, W. A., Fdry. & Mach. Co., 4437 W. Roosevelt Rd., Chicago 24, Ill.
Joyce Machine Co., Hatboro, Pa.

K

Kane & Roach, Inc., Niagara & Shonnard Sts., Syracuse 4, N. Y.
Kardong Brothers, Inc., 346 Buchanan St., Minneapolis 13, Minn.
Kaydon Engineering Corp., The, McCracken St., Muskegon, Mich.
Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis.
Kellett Aircraft Corp., State Rd. & Lansdowne Ave., Upper Darby, Pa.
Kelly Machinery Co., 2524 W. Madison St., Chicago 12, Ill.
Kemp, C. M., Mfg. Co., 405 E. Oliver St., Baltimore 2, Md.
Kennametal Inc., 200 Lloyd Ave., Latrobe, Pa.
Keokuk Electro-Metals Co., Keokuk, Ia.
Kester Solder Co., 4222 Wrightwood Ave., Chicago 39, Ill.
Keystone Steel & Wire Co., Peoria 7, Ill.
Kidde, Walter, & Co., Inc., 1154 Main St., Belleville 9, N. J.
King Fifth Wheel Co., 2915 N. Second St., Philadelphia 33, Pa.
Kinnear Mfg. Co., The, 1780-1800 Fields Ave., Columbus 16, O.
Knu-Vise Products Co., 2200 8th Ave., Detroit 16, Mich.
Koppers Co., Koppers Bldg., Pittsburgh 19, Pa.
Korfund Co., Inc., The, 48-37 32nd Place, Long Island City 1, N. Y.
Kropp Forge Co., 5301 W. Roosevelt Rd., Chicago 50, Ill.

L

Ladish Drop Forge Co., Cudahy, Wis.
Lake City Malleable Co., The, 5026 Lakeside Ave., Cleveland 14, O.
Lakeside Steel Improvement Co., The, 5418 Lakeside Ave., Cleveland 14, O.
Laminated Shim Co., Inc., 87 Union St., Glenbrook, Conn.
Lamson & Sessions Co., The, 1971 W. 85th St., Cleveland 2, O.
Landis Machine Co., Waynesboro, Pa.
Lansing Engineering Co., 934-36 Clark St., Lansing 6, Mich.
Latrobe Electric Steel Co., Latrobe, Pa.
Layne & Bowler, Inc., Memphis 8, Tenn.
Lebanon Steel Foundry, Lebanon, Pa.
LeBlond, R. K., Machine Tool Co., The, Cincinnati 8, O.
Lee, K. O., Co., Aberdeen, S. Dakota.
Leeds & Northrup Co., 4957 Stenton Ave., Philadelphia 44, Pa.
Legion Utensils Corp., 40th Ave. & 21st St., Long Island City 1, N. Y.
Lehigh Safety Shoe Co., Inc., Allentown, Pa.
Lehmann Machine Co., Choteau at Grand, St. Louis 3, Mo.
Lepel High Frequency Laboratories, Inc., 39 W. 60th St., New York 23, N. Y.
Leschen, A., & Sons Rope Co., 5909 Kennerly Ave., St. Louis 12, Mo.
Lester-Phoenix, Inc., 2629 Church Ave., Cleveland 13, O.
Levinson Steel Sales Co., The, 33 Pride St., Pittsburgh 19, Pa.
Lewis Fdry. & Machine Div. of Blaw-Knox Co., P. O. Box 1586, Pittsburgh 30, Pa.
Lewis Machine Co., 3450 E. 76th St., Cleveland 4, O.
Lewthwaite, T. H., Machine Co., 311 E. 47th St., New York 17, N. Y.
Lincoln Electric Co., The, Cleveland 1, O.
Lindbergh Engineering Co., 2466 N. Hubbard St., Chicago 12, Ill.
Linde Air Products Co., The, 30 E. 42nd St., New York 17, N. Y.
Link-Belt Co., Chicago 1, Ill.
Lisbon Hoist & Crane Co., Lisbon, O.
Littell, F. J., Machine Co., 4165 N. Ravenswood Ave., Chicago 13, Ill.
Lodge & Shipley Machine Tool Co., The, 3055 Colerain Ave., Cincinnati 25, O.
Logan Engineering Co., 4901 W. Lawrence Ave., Chicago 30, Ill.
Logemann Brothers Co., 3126 Burleigh St., Milwaukee 10, Wis.
Loveioy Flexible Coupling Co., 4973 W. Lake St., Chicago 44, Ill.
Lubriplate Div., Fiske Bros. Refining Co., Newark 5, N. J., Toledo 3, O.

Mc

McGill Mfg. Co., Inc., Valparaiso, Ind.
McKay Machine Co., The, 546 W. Raven St., Youngstown 2, O.
McKee, Arthur G., & Co., 2300 Chester Ave., Cleveland 1, O.
McQuay-Norris Mfg. Co., 2320 Marconi Ave., St. Louis 10, Mo.

M

Mackintosh-Hemphill Co., 9th & Bingham St., Pittsburgh 3, Pa.
Macklin Co., Jackson, Mich.
Macwhyte Company, 2912 14th Ave., Kenosha, Wis.
Maehler, Paul Co., The, 2208 W. Lake St., Chicago 12, Ill.
Mahon, R. C., Co., The, 8650 Mt. Elliott Ave., Detroit 11, Mich.
Mahr Mfg. Co., Div. of Diamond Iron Works Inc., 1728 Second St., N. Minneapolis 11, Minn.
Mall Tool Co., 7774 S. Chicago Ave., Chicago 19, Ill.
Manheim Mfg. & Belting Co., Manheim, Pa.
Mansaver Division, 3101 East St., New Haven 3, Conn.
Manufacturers Screw Products, 216 W. Hubbard St., Chicago 10, Ill.
Master Builders Co., The, 7016 Euclid Ave., Cleveland 3, O.
Master Electric Co., The, 100 Davis Ave., Dayton 1, O.
Master Mfg. Co., Hutchinson, Kan.
Master Products Co., The, 6400 Park Ave., Cleveland 5, O.
Masterform Tool Co., 2532 Irving Park Blvd., Chicago 18, Ill.
Mathews Conveyer Co., Ellwood City, Pa.
Matthews, Jas. H., & Co., 3978 Forbes St., Pittsburgh 13, Pa.
Mattison Machine Works, Rockford, Ill.
Mead Specialties Co., 4114 N. Knox Ave., Chicago 41, Ill.
Medart Co., The, 3500 DeKalb St., St. Louis 18, Mo.
Meehanite Research Institute, Pershing Bldg., New Rochelle, N. Y.
Mercury Mfg. Co., The, 4140 S. Halsted St., Chicago 9, Ill.
Merrill Brothers, 56-04 Arnold Ave., Maspeth, N. Y.
Merz Engineering Co., Indianapolis 7, Ind.
Mesta Machine Co., P. O. Box 1466, Pittsburgh 30, Pa.
Metal Hydrides, Inc., 12-24 Congress St., Beverly, Mass.
Metal & Thermit Corp., 120 Broadway, New York 5, N. Y.
Michiana Products Corp., Michigan City, Ind.
Michigan Steel Tube Products Co., 9450 Buffalo St., Detroit 12, Mich.
Michigan Tool Co., 7171 E. McNichols Rd., Detroit, 12, Mich.
Micromatic Hone Corp., 8100 Schoolcraft Ave., Detroit 4, Mich.
Mid-States Equipment Co., 2425 S. Michigan Ave., Chicago 16, Ill.
Midvale Co., The, Nicetown, Philadelphia 40, Pa.
Midwest Steel Corp., Charleston, W. Va.
Milton Mfg. Co., The, Milton, Pa.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee 4, Wis.
Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.
Modern Engineering Co., Inc., 3400 Pine St., St. Louis 3, Mo.
Moline Tool Co., 102 20th St., Moline, Ill.
Moltrup Steel Products Co., Beaver Falls, Pa.
Molybdenum Corp. of America, Grant Bldg., Pittsburgh 19, Pa.
Monarch Machine Tool Co., The, Sidney, O.
Monarch Steel Co., 545 W. McCarty St., Indianapolis 7, Ind.
Monsanto Chemical Co., 1700 S. Second St., St. Louis 4, Mo.
Moraine Products Div., General Motors Corp., Dayton 1, O.
Morgan Construction Co., Worcester 5, Mass.
Morgan Engineering Co., The, Alliance, O.
Morse Chain Co., Ithaca, N. Y.
Morton Salt Co., 310 So. Michigan Ave., Chicago 4, Ill.
Muehlhausen Spring Corp., 921 Michigan Ave., Logansport, Ind.
Mullins Mfg. Co., Warren, O.

N

National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
National Annealing Box Co., Washington, Pa.
National Automatic Tool Co., S. 7th & N Sts., Richmond, Ind.
National Bearing Div., American Brake Shoe Co., 4930 Manchester Ave., St. Louis 10, Mo.
National Broach & Machine Co., 5600 St. Jean Ave., Detroit 13, Mich.
National Carbon Co., Inc., 30 E. 42nd St., New York 17, N. Y.
National City Bank, Euclid Ave. & E. 6th St., Cleveland 14, O.
National Erie Corp., Erie, Pa.
National Fireproofing Corp., 202 E. Ohio St., Pittsburgh 12, Pa.
National Forge & Ordnance Co., Irvine, Warren Co., Pa.
National Foundry Sand Co., 2970 W. Grand Blvd., Detroit 2, Mich.
National Lead Co., 111 Broadway, New York 6, N. Y.
National Machinery Co., The, Tiffin, O.
National Refining Co., The, Hanna Bldg., Cleveland 15, O.
National Screw & Mfg. Co., The, 2440 E. 75th St., Cleveland 4, O.
National Steel Corp., Grant Bldg., Pittsburgh 19, Pa.
National Tool Co., The, 11200 Madison Ave., Cleveland 2, O.
National Tube Co., Frick Bldg., Pittsburgh 30, Pa.
Nelson Specialty Welding Equipment Corp., 440 Peralto St., San Leandro, Cal.
New Britain Machine Co., New Britain, Conn.
New Departure Div., General Motors Corp., Bristol, Conn.
New Jersey Zinc Co., The, 160 Front St., New York 7, N. Y.
New York Air Brake Co., The, 420 Lexington Ave., New York 17, N. Y.
New York & New Jersey Lubricant Co., 292 Madison Ave., New York 17, N. Y.
Niagara Blower Co., Dept. S-105, 6 E. 45th St., New York 17, N. Y.
Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo 11, N. Y.
Nilson, A. H., Machine Co., The, 1525 Railroad St., Bridgeport 5, Conn.
Nitralloy Corp., The, 230 Park Ave., New York 17, N. Y.
Nordstrom Valve Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Northwest Engineering Co., 28 W. Jackson Blvd., Chicago 4, Ill.
Norton Co., Worcester 6, Mass.
Nox-Rust Corp., 2463 S. Halsted St., Chicago 8, Ill.

O

Oakite Products, Inc., 30H Thames St., New York 6, N. Y.
Ohio Crankshaft Co., The, 3800 Harvard Ave., Cleveland 1, O.
Ohio Electric Mfg. Co., The, 5906 Maurice Ave., Cleveland 4, O.
Ohio Ferro Alloys Corp., Citizens Bldg., Canton 2, O.
Ohio Galvanizing & Mfg. Co., Penn St., Niles, O.
Ohio Locomotive Crane Co., Bucyrus, O.
Ohio Machine Tool Co., The, Kenton, O.

Ohio Seamless Tube Co., The, Shelby, O.
Ohio Steel Foundry Co., Lima & Springfield, O.
Ohio Tool Co., 3160 W. 160th St., Cleveland 11, O.
Oiljak Mfg. Co., Inc., 18 Depot Square, Montclair, N. J.
Oliver Iron & Steel Corp., S. 10th & Muriel Sts., Pittsburgh 3, Pa.
O'Neil-Irwin Mfg. Co., 304 8th Ave. S., Minneapolis 15, Minn.
Orton Crane & Shovel Co., 608 S. Dearborn St., Chicago 5, Ill.
Osgood Co., The, Marion, O.
Oster Mfg. Co., The, 2037 E. 61st Place, Cleveland 3, O.
Ottumwa Iron Works, Ottumwa, Ia.
Owen Bucket Co., 6013 Breakwater Ave., Cleveland 2, O.
Owens-Corning Fiberglas Corp., 1873 Nicholas Bldg., Toledo 1, O.
Ozalid Products Div. General Aniline & Film Corp., Johnson City, N. Y.

P

Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Pangborn Corporation, Hagerstown, Md.
Parish Pressed Steel Co., Reading, Pa.
Parker Appliance Co., The, 17325 Euclid Ave., Cleveland 12, O.
Parker-Kalon Corp., 208 Varick St., New York 14, N. Y.
Parker Rust Proof Co., 2158 E. Milwaukee Ave., Detroit 11, Mich.
Parkin, Wm. M., Co., The, Highland Bldg., Pittsburgh 6, Pa.
Poulsen & Nardon, Inc., 2665 Leonis Blvd., Los Angeles 11, Cal.
Pawtucket Mfg. Co., 327 Pine St., Pawtucket, R. I.
Paxson Machine Co., Benton Rd., Salem, O.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7, Mich.
Penn Brass & Copper Co., Erie, Pa.
Penn Tool & Machine Co., Danville, Ill.
Pennsylvania Eng. Works, New Castle, Pa.
Pennsylvania Flexible Metallic Tubing Co., 7250 Powers Lane, Philadelphia 42, Pa.
Pennsylvania Industrial Engineers, Div. of Union Mining Co., 2413 W. Magnolia St., Pittsburgh 12, Pa.
Pennsylvania Salt Mfg. Co., 1000 Widener Bldg., Philadelphia 7, Pa.
Penola, Inc., 34th & Smallman Sts., Pittsburgh 1, Pa.
Perfection Tool & Metal Heat Treating Co., 1740-58 W. Hubbard St., Chicago 22, Ill.
Perkins, B. F. & Son, Inc., Holyoke, Mass.
Permold Co., The, 830 W. Liberty St., Medina, O.
Pesco Products Co., 11610 Euclid Ave., Cleveland 6, O.
Philadelphia Gear Works, Erie Ave. & G St., Philadelphia 34, Pa.
Phillips Screw Manufacturers, Providence 1, R. I.
Phoenix Mfg. Co., Catasauqua, Pa.
Pickands Mather & Company, Union Commerce Bldg., Cleveland 14, O.
Pines Engineering Co., 215 S. Highland, Aurora, Ill.
Pittsburgh Coke & Chemical Co., Grant Bldg., Pittsburgh 19, Pa.
Pittsburgh Commercial Heat Treating Co. 49th St. & A. V. R. R., Pittsburgh 1, Pa.
Pittsburgh Crushed Steel Co., 4839 Harrison St., Pittsburgh 1, Pa.
Pittsburgh Gear & Machine Co., 2580-2700 Smallman St., Pittsburgh 22, Pa.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1257, Pittsburgh 30, Pa.
Pittsburgh Plate Glass Co., Brush Div., 3221 Frederick Ave., Baltimore 29, Md.
Pittsburgh Plate Glass Co., Paint Div., 632 Duquesne Way, Pittsburgh 22, Pa.
Pittsburgh Rolls Div. of Blaw-Knox Co., Pittsburgh 1, Pa.
Pittsburgh Steel Co., 1643 Grant Bldg., Pittsburgh 30, Pa.
Pittsburgh Steel Foundry Corp., Glassport, Pa.
Plymouth Locomotive Works, Fate-Root-Heath Co., Plymouth, O.
Poole Fdry. & Machine Co., Woodberry, Baltimore 11, Md.
Porter, H. K., Inc., 401 Ashland St., Everett, Mass.
Porter, H. K. Co., Inc., 49th & Harrison Sts., Pittsburgh 1, Pa.
Poulsen & Nardon, Inc., 2665 Leonis Blvd., Los Angeles 11, Cal.
Pratt-Roop Co., Louisville, Ky.
Pressed Metal Institute, Union Commerce Bldg., Cleveland 14, O.
Pressed Steel Car Co., Inc., Grant Bldg., Pittsburgh 19, Pa.
Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.

R

R-S Products Corp., 122 Berkley St., Philadelphia 44, Pa.
Ransohoff, N. Inc., 1317 Township Ave., Cincinnati 16, O.
Rapids-Standard Co., Inc., The, Peoples Nat'l Bank Bldg., Grand Rapids 2, Mich.
Rathborne, Hair & Ridgway Co., 1440 W. 21st Place, Chicago 8, Ill.
Raymond Mfg. Co., Div. Associated Spring Corp., 280 S. Centre St., Corry, Pa.
Reading Chain & Block Corp., 2102 Adams St., Reading, Pa.
Ready-Power Co., The, 3842 Grand River Ave., Detroit 8, Mich.
Reconstruction Finance Corp., 811 Vermont Ave., N. W., Washington 25, D. C.
Reid-Avery Co., The, Cleveland & Chesapeake Sts., Baltimore 22, Md.
Reid Brothers Co., Inc., 140 Elliott St., Beverly, Mass.
Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland 10, O.
Reliance Steel Div. Detroit Steel Corp., 1025 S. Oakwood Ave., Detroit 25, Mich.
Remington Rand Inc., Systems Div., 415 Fourth Ave., New York 10, N. Y.
Remmey, Richard C., Son Co., Hedley St. & Delaware River, Philadelphia 37, Pa.
Republic Drill & Tool Co., 322 S. Green St., Chicago 7, Ill.
Republic Steel Corp., Dept. ST, Cleveland 4, O.
Revere Copper & Brass Inc., 230 Park Ave., New York 17, N. Y.
Revolvator Co., 391 86th St., North Bergen, N. J.
Reynolds Metals Co., 2520 S. Third St., Louisville 1, Ky.
Rheem Research Products, Inc., 206 Standard Oil Bldg., Baltimore 2, Md.
Rhoades, R. W., Metaline Co., Inc., 50-17 Fifth St., Long Island City 1, N. Y.
Riehle Testing Machine Div. American Machine & Metals, Inc., E. Moline, Ill.
Riverside Metal Co., Riverside, N. J.
Robins Conveyors, Inc., 262 Passaic Ave., Passaic, N. J.
Robinson Bros. & Co., 135 S. LaSalle St., Chicago, Ill.
Rockford Machine Tool Co., 2400 Kishwaukee St., Rockford, Ill.
Roebling's, John A., Sons Co., Trenton 2, N. J.
Rollway Bearing Co., Inc., 541 Seymour St., Syracuse 4, N. Y.
Rolock, Inc., 1380 Kings Highway, Fairfield, Conn.
Roper, Geo. D., Corp., Rockford, Ill.
Ross Carrier Corp., Benton Harbor, Mich.
Ross Heater & Mfg. Co. Inc., 1431 West Ave., Buffalo 15, N. Y.
Ruemelin Mfg. Co., 3882 N. Palmer Ave., Milwaukee 12, Wis.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Rustless Iron & Steel Corp., 3400 E. Chase St., Baltimore 13, Md.
Ryerson, Jos. T., & Son, Inc., 16th & Rockwell Sts., Chicago 80, Ill.

S

S K F Industries, Inc., Front St. & Erie Ave., Philadelphia 34, Pa.
SKF Steels, Inc., 420 Lexington Ave., New York 17, N. Y.
Safety Grinding Wheel & Machine Co., P. O. Box 746, Springfield, O.
Saginaw Malleable Iron Div., General Motors Corp., Saginaw, Mich.
Salem Engineering Co., 714 S. Broadway, Salem, O.
Samuel, Frank, & Co. Inc., Harrison Bldg., Philadelphia 2, Pa.
Sandvik Steel, Inc., 111 Eighth Ave., New York 11, N. Y.
Saunders, Alexander, & Co., 95 Bedford St., New York 14, N. Y.
Scaife Co., Ann St., Oakmont, Pa.
Schneible, Claude B., Co., 2827 25th St., Detroit 16, Mich.
Sciaky Bros., 4915 W. 67th St., Chicago 38, Ill.
Scovill Mfg. Co., 20 Mill St., Waterbury 91, Conn.
Scully-Jones & Co., 1901 S. Rockwell St., Chicago 8, Ill.
Seneca Wire & Mfg. Co., The, Fostoria, O.
Seymour Mfg. Co., The, 51 Franklin St., Seymour, Conn.
Sharon Steel Corp., Sharon, Pa.
Shawinigan Products Corp., Empire State Bldg., New York 1, N. Y.
Shell Oil Co., Inc., 50 W. 50th St., New York 20, N. Y.
Shenango-Penn Mold Co., Oliver Bldg., Pittsburgh 22, Pa.
Shenango-Penn Mold Co., Bronze Dept. 457, W. Third St., Dover, O.
Shepard Niles Crane & Hoist Corp., 358 Schuyler Ave., Montour Falls, N. Y.
Shuster, F. B., Mfg. Co., Inc., The, New Haven 9, Conn.
Silent Hoist & Crane Co., 849 63rd St., Brooklyn 20, N. Y.
Simmons Machine Tool Corp., 1755 N. Broadway, Albany 1, N. Y.
Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
Simonds Gear & Mfg. Co., The, 25th St., Pittsburgh 22, Pa.
Simonds Saw & Steel Co., 1350 Columbia Rd., Boston 27, Mass.
Simonds Worden White Co., 714 Negley Place, Dayton 7, O.
Snyder, W. P., & Co., Oliver Bldg., Pittsburgh 22, Pa.
Snyder Tool & Engineering Co., 3400 E. Lafayette Ave., Detroit 7, Mich.
Socony-Vacuum Oil Co. Inc., 26 Broadway, New York 4, N. Y.
Solar Precision Castings, Inc., 18th & Grand Sts., Des Moines 5, Ia.
Sonken-Galamba Corp., 108 N. 2nd St., Kansas City, Kan.
Sossner Co., 161 Grand St., New York 13, N. Y.
South Bend Lathe Works, 429 Madison St., South Bend 22, Ind.
Southern Ferro Alloys Co., 2108 Chestnut St., Chattanooga 2, Tenn.
Spe-D-Cut Tool Co., Hannibal, Mo.
Square D Co., 4041 N. Richards St., Milwaukee 12, Wis.
Standard Pressed Steel Co., Box 579, Jenkintown, Pa.
Standard Steel Spring Co., Coraopolis, Pa.
Standard Steel Works Div. of the Baldwin Locomotive Works, Paschall P. O., Philadelphia 42, Pa.
Standard Tube Co., The, 14600 Woodward Ave., Detroit 3, Mich.
Standard Varnish Works, 2600 Richmond Terrace, Staten Island 3, N. Y.
Stanley Works, The, New Britain & Bridgeport, Conn.
Steel and Tubes Div. Republic Steel Corp. 226 E. 131st St., Cleveland 8, O.
Steel City Testing Laboratory, 8843 Livernois Ave., Detroit 4, Mich.
Steel Founders' Society of America, 920 Midland Bldg., Cleveland 15, O.
Steel Improvement & Forge Co., The, 950 E. 64th St., Cleveland 14, O.
Steel Parts Mfg. Corp. Div. of Blackstone Mfg. Co., 226 S. Morgan St., Chicago 7, Ill.
Steel Products Engineering Co., The, 1205 W. Columbia St., Springfield, O.
Sterling Grinding Wheel, The, Div. of The Cleveland Quarries Co., Tiffin, O.
Sticht, Herman H., Co., 27 Park Place, New York 7, N. Y.
Stokerunit Corp., 4548 W. Mitchell St., Milwaukee 14, Wis.
Streine Tool & Mfg. Co., The, New Bremen, O.
Strom Steel Ball Co., 1850 S. 54th Ave., Cicero 50, Ill.
Strong Steel Foundry Co., Hertel & Norris Aves., Buffalo 7, N. Y.
Struthers Wells Corp., Titusville, Pa.
Stuart, D. A., Oil Co., Ltd., 2735½ S. Troy St., Chicago 23, Ill.
Sturtevant, B. F., Co., Hyde Park, Boston 36, Mass.
Sun Oil Co., Dept. 1, Philadelphia 3, Pa.
Sundstrand Machine Tool Co., 2540 Eleventh St., Rockford, Ill.
Superior Sheet Steel Div., Continental Steel Corp., Canton, O.
Superior Steel Corp., Carnegie, Pa.
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Sutton Engineering Co., Bellefonte, Pa.
Swindell-Dressler Corp., P. O. Box 1888, Pittsburgh 30, Pa.

T

Tate-Jones & Co., Inc., Plaza Bldg., Pittsburgh 19, Pa.
Taylor-Wharton Iron & Steel Co., Easton, Pa.
Taylor-Wilson Mfg. Co., 15 Thomson Ave., McKees Rocks, Pa.
Taylor-Winfield Corp., Warren, O.
Texas Co., The, 135 E. 42nd St., New York 7, N. Y.
Thew Shovel Co., The, Lorain, O.
Thomas Machine Mfg. Co., Etna Branch P. O., Pittsburgh 23, Pa.
Thomas Steel Co., The, Warren, O.
Thompson Grinder Co., Inc., 1534 W. Main St., Springfield, O.
Tide Water Associated Oil Co., 17 Battery Pl., New York 4, N. Y.
Timken Roller Bearing Co., The, Canton 6, O.
Timken Roller Bearing Co., The, Steel & Tube Div., Canton 6, O.
Tinnerman Products Inc., 2039 Fulton Rd., Cleveland 13, O.
Titan Tool Co., Fairview, Pa.
Titanium Alloy Mfg. Co., The, Niagara Falls, N. Y.
Toledo Stamping & Mfg. Co., 90 Fearing Blvd., Toledo 7, O.
Tomkins-Johnson Co., The, Dept. S, 611 N. Mechanic St., Jackson, Mich.
Torrington Co., The, Torrington, Conn.
Tourek, J. J., Mfg. Co., 4701-11 W. 16th St., Chicago 50, Ill.

Towmotor Corp.,
1223 E. 152nd St.,
Cleveland 10, O.
Trabon Engineering Corp.,
1818 E. 40th St., Cleveland 3, O.
Trico Products Corp.,
Buffalo 3, N. Y.
Triplex Screw Co.,
5341 Grant Ave., Cleveland 5, O.
Trundle Engineering Co., The,
Bulkley Bldg., Cleveland 15, O.
Tube Reducing Corp.,
Wallington, N. J.
Tube Turns, Inc.,
224 E. Broadway,
Louisville 1, Ky.
Tubular Service Corp., 32 Broadway,
New York 4, N. Y.
Turco Products, Inc.,
6135 S. Central Ave.,
Los Angeles 54, Cal.
Tweco Products Co.,
1018 E. English St.,
Wichita 7, Kan.
Twin Disc Clutch Co.,
1379 Racine Ave., Racine, Wis.

U

Udylite Corp., The,
1651 E. Grand Blvd.,
Detroit 11, Mich.
Union Asbestos & Rubber Co.,
1821 S. 54th Ave., Cicero 50, Ill.
Union Chain & Mfg. Co.,
Sandusky, O.
Union Drawn Steel Div.,
Republic Steel Corp.,
Massillon, O.
Union Steel Castings Div. of Blaw-Knox Co., Pittsburgh 1, Pa.
Union Wire Rope Corp.,
21st and Manchester Ave.,
Kansas City 3, Mo.
United Chromium, Inc.,
51 E. 42nd St.,
New York 17, N. Y.
United Engineering & Foundry Co.,
1st Nat'l Bank Bldg.,
Pittsburgh 22, Pa.
U. S. Automatic Corp.,
Amherst, O.
United States Graphite Co., The,
Saginaw, Mich.
United States Rubber Co., Mechanical Goods Div., 1230 Sixth Ave.,
New York 20, N. Y.
United States Steel Corp.,
436—7th Ave., Pittsburgh 30, Pa.
United States Steel Supply,
P. O. Box M M, Chicago 90, Ill.
Universal Engineering Co.,
Frankenmuth, Mich.
Upton Electric Furnace Div.
Commerce Pattern Fdry. & Machine Co., 7450 Melville Ave.,
Detroit 17, Mich.

V

Valley Mould & Iron Co.,
Hubbard, O.
Vanadium-Alloys Steel Co.,
Latrobe, Pa.
Vanadium Corp. of America,
420 Lexington Ave.,
New York 17, N. Y.
Van Dorn Iron Works Co.,
2685 E. 79th St., Cleveland 4, O.
Vascoloy-Ramet Corp.,
N. Chicago, Ill.
Vaughn Machinery Co.,
Cuyahoga Falls, O.
Veeder-Root, Inc.,
Hartford 2, Conn.
Verd-A-Ray Corp.,
615 Front St., Toledo 3, O.
Verson Allsteel Press Co.,
1355 E. 93rd St., Chicago 19, Ill.
Vickers, Inc.,
1480 Oakman Blvd.,
Detroit 32, Mich.
Victor Equipment Co.,
844-54 Folsom St.
San Francisco 7, Cal.
Vulcan Iron Works,
Wilkes-Barre, Pa.

W

E. R. Wagner Mfg. Co.,
4615 N. 32nd St.,
Milwaukee 9 Wis.
Waldron, John, Corp.,
New Brunswick, N. J.
Walker-Turner Co. Inc.,
50123 Berckman St.,
Plainfield, N. J.
Walsh Press & Die Co., Div. of American Machine & Gage Co.,
4725 W. Kinzie St.,
Chicago 44, Ill.
Wapakoneta Machine Co., The,
Wapakoneta, O.
Ward Leonard Electric Co.,
65 South St., Mt. Vernon, N. Y.
Ward Steel Co.,
44 Farnsworth St.,
Boston 10, Mass.
Warner & Swasey Co.,
5701 Carnegie Ave.,
Cleveland 3, O.
Warren City Mfg. Co., Warren, O.
Washburn Wire Co.,
118th St. & Harlem River,
New York 35, N. Y.
Wean Engineering Co., Inc., The,
Warren, O.
Weatherhead Co., The,
300 E. 131st St., Cleveland 8 O.
Webb Corp., The, Webb City, Mo.
Webber Gage Co., 12900 Triskett Rd., Cleveland 11, O.
Weinman Pump & Supply Co., The,
207-209 Blvd. of the Allies,
Pittsburgh 22, Pa.
Weirton Steel Co.,
Weirton, W. Va.
Weldex Inc., 7324 McDonald Ave.,
Detroit 10, Mich.
Wellman Bronze & Aluminum Co., The, 2539 E. 93rd St.,
Cleveland 4, O.
Wellman Engineering Co., The, 7000 Central Ave., Cleveland 4, O.
Wells Mfg. Co.,
1515 Fillmore St.,
Three Rivers, Mich.
Wesche, B. A., Electric Co., The,
1628 Vine St., Cincinnati 10, O.
West Penn Machinery Co.,
1208 House Bldg.,
Pittsburgh 22, Pa.
Western Automatic Machine Screw Co., Elyria, O.
Western Brass Mills Div. of Olin Industries, E. Alton, Ill.
Westinghouse Electric Corp.,
Dept. 7-N, E. Pittsburgh, Pa.
Wheeling Steel Corp.,
Wheeling, W. Va.
Whitcomb Locomotive Co.,
Rochelle, Ill.
Whitehead Stamping Co.,
1667 W. Lafayette Blvd.,
Detroit 16, Mich.
Wickes Brothers,
Saginaw, Mich.
Wickwire Brothers,
189 Main St., Cortland, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Co.,
500 Fifth Ave.,
New York 18, N. Y.
Wilkens-Anderson Co.,
111 N. Canal St., Chicago 6, Ill.
Williams, J. H., & Co.,
400 Vulcan St., Buffalo 7, N. Y.
Willson Products, Inc.,
2nd & Washington Sts.,
Reading, Pa.
Wilson, Lee, Engineering Co., Inc.,
20005 Lake Rd., Cleveland 16, O.
Wisconsin Motor Corp.,
Milwaukee 14, Wis.
Wisconsin Steel Co.,
180 N. Michigan Ave.,
Chicago 1, Ill.
Wolff, Benjamin, & Co., 58th St. at Seeley Ave., Chicago 36, Ill.
Wood, R. D., Co.,
400 Chestnut St.,
Philadelphia 5, Pa.
Wood Shovel & Tool Co.,
Piqua, O.
Woodworth, N. A., Co.,
1300 E. Nine Mile Rd.,
Detroit 20, Mich.
Worcester Pressed Steel Co.,
512 Barber Ave.,
Worcester 6, Mass.
Worth Steel Co.,
Claymont, Del.
Wright Mfg. Div., American Chain & Cable Co.,
York, Pa.
Wright-Hibbard Industrial Electric Truck Inc., Phelps, N. Y.
Wrigley, Wm., Jr. Co.,
410 N. Michigan Ave.,
Chicago 11, Ill.
Wrought Washer Mfg. Co.,
2103 S. Bay St., Milwaukee 7, Wis.
Wyckoff Steel Co.,
P. O. Box 1256, Pittsburgh 30, Pa.
Wyman-Gordon Products Corp.,
Worcester, Mass.

Y

Yoder Co., The,
5500 Walworth Ave.,
Cleveland 2, O.
Young & Ward Inc., Fair & Elm Sts.,
Hillsboro, O.
Youngstown Sheet & Tube Co., The,
Youngstown 1, O.
Youngstown Welding & Engineering Co., The, 3711 Oakwood Ave.,
Youngstown 9, O.

Z

Zeh & Hahnemann Co.,
56 Avenue A, Newark 5, N. J.
Ziv Steel & Wire Co.,
2945 W. Harrison St.,
Chicago 12, Ill.
Zurn, J. A., Mfg. Co.,
Erie, Pa.